Smithsonian Institution
Scholarly Press

SMITHSONIAN CONTRIBUTIONS TO BOTANY • NUMBER 108



Grasses of Mali

Kamal M. Ibrahim,
Shruti Dube,
Paul M. Peterson, and
Hasnaa A. Hosni

SERIES PUBLICATIONS OF THE SMITHSONIAN INSTITUTION

Emphasis upon publication as a means of "diffusing knowledge" was expressed by the first Secretary of the Smithsonian. In his formal plan for the Institution, Joseph Henry outlined a program that included the following statement: "It is proposed to publish a series of reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge." This theme of basic research has been adhered to through the years in thousands of titles issued in series publications under the Smithsonian imprint, commencing with Smithsonian Contributions to Knowledge in 1848 and continuing with the following active series:

Smithsonian Contributions to Anthropology
Smithsonian Contributions to Botany
Smithsonian Contributions to History and Technology
Smithsonian Contributions to the Marine Sciences
Smithsonian Contributions to Museum Conservation
Smithsonian Contributions to Paleobiology
Smithsonian Contributions to Zoology

In these series, the Smithsonian Institution Scholarly Press (SISP) publishes small papers and full-scale monographs that report on research and collections of the Institution's museums and research centers. The Smithsonian Contributions Series are distributed via exchange mailing lists to libraries, universities, and similar institutions throughout the world.

Manuscripts intended for publication in the Contributions Series undergo substantive peer review and evaluation by SISP's Editorial Board, as well as evaluation by SISP for compliance with manuscript preparation guidelines (available at https://scholarlypress.si.edu). For fully searchable PDFs of all open access series and publications of the Smithsonian Institution Scholarly Press, visit Open SI at https://opensi.si.edu.

SMITHSONIAN CONTRIBUTIONS TO BOTANY • NUMBER 108

Grasses of Mali

Kamal M. Ibrahim,
Shruti Dube,
Paul M. Peterson, and
Hasnaa A. Hosni



Smithsonian Institution
Scholarly Press
WASHINGTON, D.C.
2018

ABSTRACT

Ibrahim, Kamal M., Shruti Dube, Paul M. Peterson, and Hasnaa A. Hosni. Grasses of Mali. *Smithsonian Contributions to Botany*, Number 108, x + 146 pages, 208 figures, 2018. — A vegetative key, descriptions, and illustrations for the identification of 199 native and naturalized grasses that occur in Mali are presented. In addition, we provide a modern classification, glossary of terms, and indexes to scientific and common names. The key is based on vegetative characters to allow identification of specimens that do not have flowering structures (inflorescences and spikelets). Two new combinations are made, *Urochloa orthostachys* and *Urochloa stigmatisata*, and we lectotypify *Panicum orthostachys*.

Cover images, from left to right: *Phragmites karka* inflorescence (Figure 149C); *Sorghastrum stipoides* inflorescence (Figure 170C); *Cenchrus biflorus* spikelet (Figure 41C); *Tripogonella minima* habit (Figure 192A); *Oxytenanthera abyssinica* ligule, sheath apex, and leaf blade (Figure 137B); *Loudetiopsis kerstingii* inflorescence (Figure 127C); *Ctenium villosum* inflorescence (Figure 59C).

Published by
SMITHSONIAN INSTITUTION SCHOLARLY PRESS
P.O. Box 37012, MRC 957, Washington, D.C. 20013-7012
https://scholarlypress.si.edu

Compilation copyright © 2018 Smithsonian Institution

The rights to all text and images in this publication, including cover and interior designs, are owned either by the Smithsonian Institution, by contributing authors, or by third parties. Fair use of materials is permitted for personal, educational, or noncommercial purposes. Users must cite author and source of content, must not alter or modify copyrighted content, and must comply with all other terms or restrictions that may be applicable. Users are responsible for securing permission from a rights holder for any other use.

Library of Congress Cataloging-in-Publication Data
Names: Ibrahim, Kamal M., author. | Smithsonian Institution Scholarly Press, publisher.
Title: Grasses of Mali / Kamal M. Ibrahim [and three others].
Other titles: Smithsonian contributions to botany; no. 108. 0081-024X
Description: Washington, D.C. : Smithsonian Institution Scholarly Press, 2018. | Series: Smithsonian contributions to botany, ISSN 0081-024X ; number 108 | Includes bibliographical references. | Smithsonian Institution Compilation copyright 2018
Identifiers: LCCN 2018026742
Subjects: LCSH: Grasses—Mali—Identification. | Grasses—Mali—Classification.
Classification: LCC QK495.G74 I245 2018 | DDC 584/.92096623—dc23 | SUDOC SI 1.29:108
LC record available at https://lccn.loc.gov/2018026742

ISSN: 1938-2812 (online); 0081-024X (print)

Publication date (online): 26 October 2018

♾ The paper used in this publication meets the minimum requirements of the American National Standard for Permanence of Paper for Printed Library Materials Z39.48–1992.

Contents

LIST OF FIGURES v

INTRODUCTION 1
- Morphological Characters 2
- Vegetation 7
- Identification 7
- Synopsis 11
- Acknowledgments 11

VEGETATIVE KEY TO THE GRASSES OF MALI 13

DESCRIPTIONS 25

GLOSSARY OF TERMS 131

REFERENCES 137

INDEX OF COMMON NAMES (MALI) 139

INDEX OF COMMON NAMES (ENGLISH) 141

INDEX OF SCIENTIFIC NAMES 145

Figures

1. General morphology **2**
2. Growth forms **3**
3. Types of sheaths, auricles, and collars **4**
4. Ligules types, shapes, and margins **5**
5. Leaf blade apices, bases, and margins **6**
6. Leaf blade characteristics **7**
7. Inflorescence types **8**
8. Inflorescence and spikelet characteristics **9**
9. Vegetation map of Mali **10**
10. *Acrachne racemosa* **25**
11. *Acroceras amplectens* **26**
12. *Alloteropsis paniculata* **26**
13. *Anadelphia afzeliana* **27**
14. *Anadelphia leptocoma* **27**
15. *Andropogon africanus* **28**
16. *Andropogon canaliculatus* **28**
17. *Andropogon chevalieri* **29**
18. *Andropogon festuciformis* **29**
19. *Andropogon gayanus* **30**
20. *Andropogon ivorensis* **30**
21. *Andropogon perligulatus* **31**
22. *Andropogon pseudapricus* **31**
23. *Andropogon tectorum* **32**
24. *Anthephora pubescens* **32**
25. *Aristida adscensionis* **33**
26. *Aristida cumingiana* var. *uniseta* **34**
27. *Aristida diminuta* **34**
28. *Aristida funiculata* **35**
29. *Aristida hordeacea* **35**
30. *Aristida kunthiana* **36**
31. *Aristida mutabilis* **36**
32. *Aristida recta* **37**
33. *Aristida rhiniochloa* **37**
34. *Aristida sieberiana* **38**
35. *Aristida stipoides* **38**

36. *Arthraxon lancifolius* **39**
37. *Arundinella nepalensis* **39**
38. *Avena sativa* **40**
39. *Bambusa vulgaris* **40**
40. *Cenchrus americanus* **41**
41. *Cenchrus biflorus* **41**
42. *Cenchrus ciliaris* **42**
43. *Cenchrus hordeoides* **43**
44. *Cenchrus pedicellatus* **43**
45. *Cenchrus polystachios* subsp. *atrichus* **44**
46. *Cenchrus prieurii* **44**
47. *Cenchrus violaceus* **45**
48. *Chloris gayana* **45**
49. *Chloris pilosa* **46**
50. *Chloris prieurii* **46**
51. *Chloris virgata* **47**
52. *Chrysochloa hindsii* **47**
53. *Chrysopogon fulvibarbis* **48**
54. *Chrysopogon nigritanus* **48**
55. *Coelachyrum brevifolium* **49**
56. *Coix lacryma-jobi* **49**
57. *Ctenium elegans* **50**
58. *Ctenium newtonii* **50**
59. *Ctenium villosum* **51**
60. *Cymbopogon caesius* **51**
61. *Cymbopogon schoenanthus* **52**
62. *Cynodon dactylon* **52**
63. *Dactyloctenium aegyptium* **53**
64. *Dichanthium annulatum* **53**
65. *Dichanthium foveolatum* **54**
66. *Diectomis fastigiata* **54**
67. *Digitaria acuminatissima* **55**
68. *Digitaria aristulata* **55**
69. *Digitaria barbinodis* **56**
70. *Digitaria ciliaris* **56**
71. *Digitaria debilis* **57**
72. *Digitaria delicata* **57**
73. *Digitaria delicatula* **58**
74. *Digitaria exilis* **58**
75. *Digitaria fragilis* **59**
76. *Digitaria gayana* **59**
77. *Digitaria leptorachis* **60**
78. *Digitaria longiflora* **60**
79. *Digitaria nuda* **61**
80. *Digitaria ternata* **62**
81. *Diheteropogon hagerupii* **62**
82. *Dilophotriche tristachyoides* **63**
83. *Dinebra coerulescens* **63**
84. *Echinochloa callopus* **64**
85. *Echinochloa colona* **64**
86. *Echinochloa pyramidalis* **65**
87. *Echinochloa stagnina* **65**
88. *Eleusine africana* **66**
89. *Eleusine indica* **66**

90. *Elionurus elegans* **67**
91. *Elymandra androphila* **67**
92. *Elytrophorus spicatus* **68**
93. *Enneapogon persicus* **68**
94. *Eragrostis aegyptiaca* **69**
95. *Eragrostis aspera* **69**
96. *Eragrostis atrovirens* **70**
97. *Eragrostis barteri* **71**
98. *Eragrostis cilianensis* **71**
99. *Eragrostis ciliaris* **72**
100. *Eragrostis gangetica* **72**
101. *Eragrostis japonica* **73**
102. *Eragrostis lingulata* **73**
103. *Eragrostis pilosa* **74**
104. *Eragrostis plurigluma* **74**
105. *Eragrostis prolifera* **75**
106. *Eragrostis squamata* **75**
107. *Eragrostis tenella* **76**
108. *Eragrostis tremula* **76**
109. *Eragrostis turgida* **77**
110. *Eriochloa fatmensis* **77**
111. *Euclasta condylotricha* **78**
112. *Hackelochloa granularis* **78**
113. *Hemarthria altissima* **79**
114. *Hyparrhenia cyanescens* **79**
115. *Hyparrhenia rufa* **80**
116. *Hyparrhenia subplumosa* **81**
117. *Hyperthelia dissoluta* **81**
118. *Imperata cylindrica* **82**
119. *Ischaemum polystachyum* **82**
120. *Lasiurus scindicus* **83**
121. *Leersia hexandra* **83**
122. *Leptothrium senegalense* **84**
123. *Loudetia hordeiformis* **84**
124. *Loudetia phragmitoides* **85**
125. *Loudetia simplex* **85**
126. *Loudetia togoensis* **86**
127. *Loudetiopsis kerstingii* **87**
128. *Micrachne obtusiflora* **87**
129. *Microchloa indica* **88**
130. *Oplismenus hirtellus* **88**
131. *Oropetium aristatum* **89**
132. *Oropetium capense* **89**
133. *Oryza barthii* **90**
134. *Oryza brachyantha* **90**
135. *Oryza longistaminata* **91**
136. *Oryza sativa* **91**
137. *Oxytenanthera abyssinica* **92**
138. *Panicum anabaptistum* **92**
139. *Panicum antidotale* **93**
140. *Panicum callosum* **93**
141. *Panicum fluviicola* **94**
142. *Panicum laetum* **94**
143. *Panicum repens* **95**

144. *Panicum tenellum* 95
145. *Panicum turgidum* 96
146. *Panicum walense* 96
147. *Parahyparrhenia annua* 97
148. *Paspalum scrobiculatum* 97
149. *Phragmites karka* 98
150. *Rhytachne rottboellioides* 98
151. *Rhytachne triaristata* 99
152. *Rottboellia afraurita* 100
153. *Sacciolepis africana* 100
154. *Sacciolepis chevalieri* 101
155. *Sacciolepis micrococca* 101
156. *Schizachyrium brevifolium* 102
157. *Schizachyrium exile* 102
158. *Schizachyrium gresicola* 103
159. *Schizachyrium nodulosum* 103
160. *Schizachyrium ruderale* 104
161. *Schizachyrium rupestre* 104
162. *Schizachyrium sanguineum* 105
163. *Schoenefeldia gracilis* 105
164. *Sehima ischaemoides* 106
165. *Setaria barbata* 106
166. *Setaria geminata* 107
167. *Setaria pumila* 108
168. *Setaria sphacelata* var. *anceps* 108
169. *Setaria verticillata* 109
170. *Sorghastrum stipoides* 109
171. *Sorghum arundinaceum* 110
172. *Sorghum bicolor* 110
173. *Sporobolus festivus* 111
174. *Sporobolus helvolus* 112
175. *Sporobolus ioclados* 112
176. *Sporobolus microprotus* 113
177. *Sporobolus pectinellus* 113
178. *Sporobolus pyramidalis* 113
179. *Sporobolus spicatus* 114
180. *Sporobolus stolzii* 114
181. *Stapfochloa lamproparia* 115
182. *Stipagrostis acutiflora* 115
183. *Stipagrostis hirtigluma* 116
184. *Stipagrostis uniplumis* 116
185. *Tetrapogon cenchriformis* 117
186. *Themeda triandra* 117
187. *Tragus berteronianus* 118
188. *Tragus racemosus* 118
189. *Trichanthecium brazzavillense* 119
190. *Trichanthecium parvifolium* 119
191. *Trichoneura mollis* 120
192. *Tripogonella minima* 120
193. *Tristachya superba* 121
194. *Triticum aestivum* 121
195. *Urelytrum muricatum* 122
196. *Urochloa arrecta* 122
197. *Urochloa deflexa* 123

198. *Urochloa jubata* **123**
199. *Urochloa lata* **124**
200. *Urochloa mutica* **124**
201. *Urochloa orthostachys* **125**
202. *Urochloa ramosa* **125**
203. *Urochloa stigmatisata* **126**
204. *Urochloa trichopus* **126**
205. *Urochloa villosa* **127**
206. *Urochloa xantholeuca* **127**
207. *Vossia cuspidata* **128**
208. *Zea mays* **128**

Grasses of Mali

Kamal M. Ibrahim,[1] Shruti Dube,[1] Paul M. Peterson,[1] and Hasnaa A. Hosni[2]*

INTRODUCTION

Three hundred years before the Christian era, Theophrastus, a Greek scholar, recognized the grass family. The first scientific subdivision of the family was made by Brown (1814), who recognized two different spikelet types between the Panicoideae and Pooideae (Festucoideae) subfamilies. Bentham (1881) recognized 13 tribes in two major subfamilies. This classification using two subfamilies was adopted by most agrostologists for almost 150 years until more modern syntheses. With the infusion of molecular data, the present concept and classification of the grasses is changing at a rapid rate. We follow the grass classification presented in Soreng et al. (2017a, 2017b) and Peterson et al. (2017), which consists of ±11,506 species in 768 genera found in 12 subfamilies, 52 tribes, and 94 subtribes. We provide a synopsis of the classification for all grass genera that occur in Mali.

The most accurate way to identify grasses is to use floral characteristics. However, it is often necessary to identify grasses without having mature plants or only portions of those plants without complete spikelets. Under such conditions conventional botanical manuals offer little assistance. Moreover, identification using floral characteristics requires special training in grass taxonomy that is not available to most agronomists, technical field staff, and/or interested amateurs. Vegetative characters can be used for plant identification until a flowering specimen is obtained for positive verification. Vegetative structures of the grasses are easily visible and do not require any tool except a pocket hand lens (10–14×). Some vegetative characters are not particularly constant, so it is important to use characters that are less mutable and subject to environmental influences.

A common name often can help collectors and field officers tentatively identify a grass, particularly when local people have used a common name to describe a grass. Any given species may have one or more common names. Two or more grass species may have the same common name, and some species have no common name. Extensive local names are reported in Poilecot (1995, 1999) in several languages used in western Africa.

This publication presents a key, available Mali and English common names, descriptions, illustrations, and a glossary for the identification of 199 native and naturalized grasses that occur in Mali. Indexes to the common and scientific names are also included. This list of species is primarily based on the Kew list of the grasses of Mali, which has been updated. We have consulted many taxonomic treatments during the preparation of this work; most notable are Bogdan (1977), Clayton (1970a, 1970b), Clayton and Renvoize (1982), Clayton et al. (1974, 2006), Cope (1999, 2005), Freckman and Lelong (2003), Hatch (2003), Hilu (2003), Hitchcock (1951), Ibrahim and Kabuye (1988),

[1] Department of Botany, National Museum of Natural History, Smithsonian Institution, MRC 166, P.O. Box 37012, Washington, D.C. 20013-7012, USA.

[2] Department of Botany and Microbiology and The Herbarium, Faculty of Science, Cairo University, Giza 12613, Egypt.

* Correspondence: peterson@si.edu

Manuscript received 28 September 2017; accepted 9 April 2018.

Ibrahim et al. (2016), Michael (2003), Morrison (2007), Muller (1984), Peterson (2003), Peterson et al. (2010, 2011, 2012, 2014a, 2014b, 2014c, 2014d, 2015, 2016), Romaschenko et al. (2012), Rominger (2003), Rose Innes (1977), Saarela et al. (2014), Schloz and Schloz (1983), Stanfield (1970), Townron (1959), Wipff (2003a, 2003b), and Wipff and Thompson (2003).

The descriptions of each species are presented in alphabetical order. We use the accepted species names in the *Catalogue of New World Grasses* (Soreng et al., 2017a) and consulted Quattrocchi (2006) and the U.S. Department of Agriculture–Natural Resources Conservation Service PLANTS Database to prepare the list of common names. We follow a worldwide generic classification based principally on molecular DNA sequence studies (Soreng et al., 2017b). Vegetative characteristics are used to construct the key for identification. Diagrammatic illustrations are presented for each species to emphasize the structural characteristics.

Morphological Characters

The common grass habit for most species is an upright, cylindrical, rarely compressed culm (stem) anchored in the soil by adventitious roots (Figure 1). The culm consists of nodes and

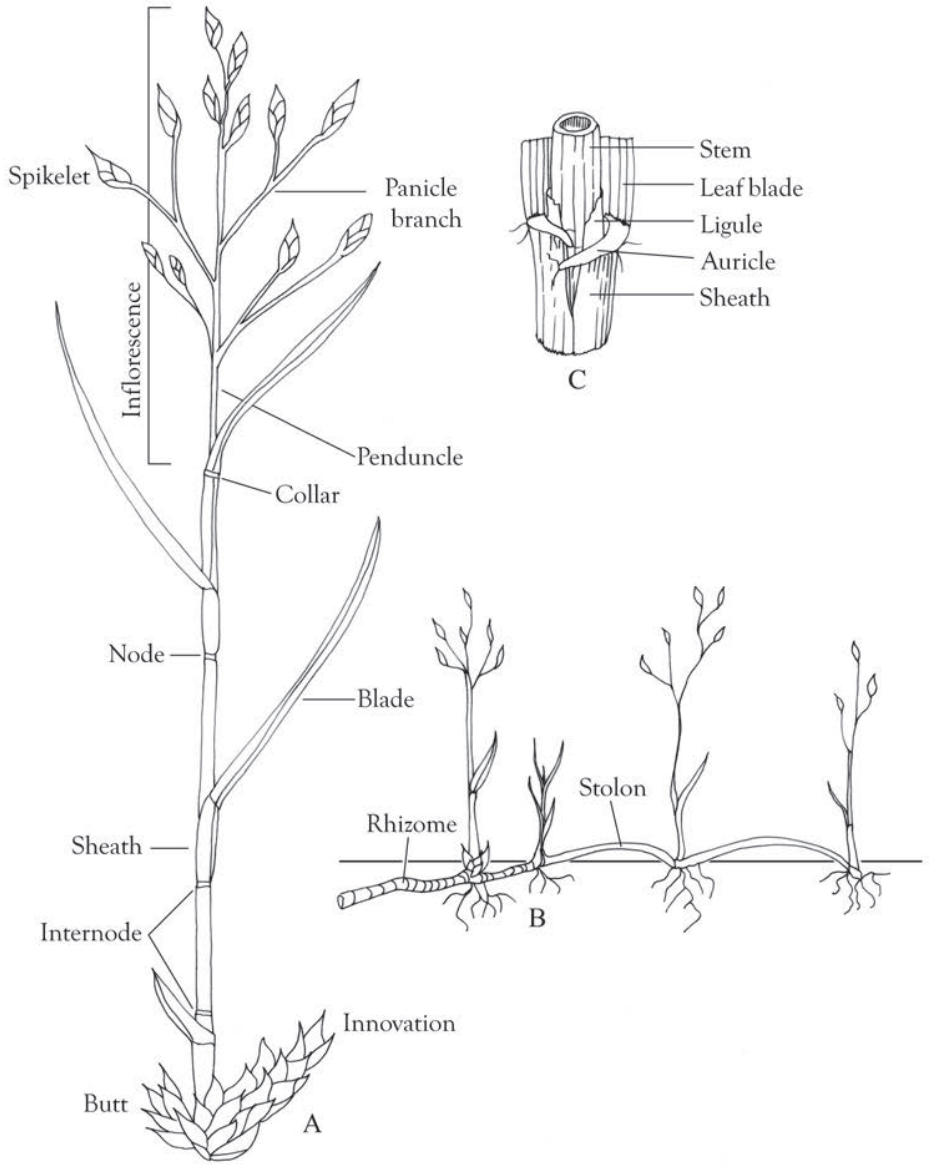


FIGURE 1. General morphology. A. Culm. B. Rhizome and stolon. C. Sheath, ligule, and blade.

internodes with leaves distichously arising from the nodes. The inflorescence usually comprises numerous spikelets that are composed of one or more florets that contain the flower parts (pistil and stamens). The general morphology of a grass is shown in detail in Figures 1–8.

ROOTS. The luxuriant fibrous root system anchors the growing grass plant and comprises adventitious roots originating from the lower culm nodes (Figure 2). In some grasses additional prop roots emerge from the lower culm nodes just above ground level. Most grasses with geniculate culms root at the lower nodes.

RHIZOMES. A rhizome is a more or less horizontal underground stem whose leaves are reduced to scales. Eventually it emerges above the ground surface to form a new flowering shoot or culm.

STOLONS. A stolon is a trailing or reclining, aboveground stem that produces roots and flowering shoots from its nodes.

CULMS. The grass stem is known as a culm (Figure 1) and consists of a series of internodes and nodes. The internodes at the base of a culm are very short, whereas in the upper portion of a culm they extend to a considerable length. Internodes are



FIGURE 2. A. Growth forms. A. Erect. B. Geniculate. C. Prostrate. D. Decumbent.

usually hollow but sometimes are solid, as in *Saccharum,* or filled with white pith, as in *Sorghum.* The plant height varies considerably based on the stage of growth, environmental conditions, and the species genetic makeup. Culms are mostly glabrous, particularly the sections enveloped by the leaf sheaths. Nodes vary, and in some species they are hairy, whereas in others they are glabrous.

Branching is from the buds situated below the leaf sheath at the nodes. Branching usually occurs at basal nodes only, or from basal, middle, and upper nodes. If the shoot initial remains within the sheath that envelops the node, the branching is intravaginal. If the shoot initial grows laterally in a manner that ruptures the enveloping sheath, the branching habit is extravaginal. Branches from the base of the plant are known as tillers.

Leaves. A grass leaf is divided into the following parts: the leaf sheath (at the base) and the blade, also known as the lamina.

Sheaths. The leaf sheath originates at a node and protects the growing zone of the internode and structurally strengthens the culm. Sheaths are usually open and sometimes split with overlapping margins, or sheaths are closed with margins fused for all or part of their length. The sheath may be compressed or round, or occasionally keeled at the midrib. In some species, sheaths are longer than the blades, and in a few species they are longer than the adjacent internodes. Usually sheaths are of a paler shade of green than the blades and often are tinged with pink or purple at the base. They also are tinted with darker color near the blades. The tints are not consistent enough to be of much value in identification. Presence or absence of hairs on the sheath margins, surface, and the junction with the blade is an important characteristic for use in the identification (Figure 3).

Auricles. An auricle is an appendage that projects from each side of the collar that marks the division between the sheath and blade. Auricles may be horizontally clawed, rudimentary, or fully or slightly rounded. Most species do not possess auricles (Figure 3).

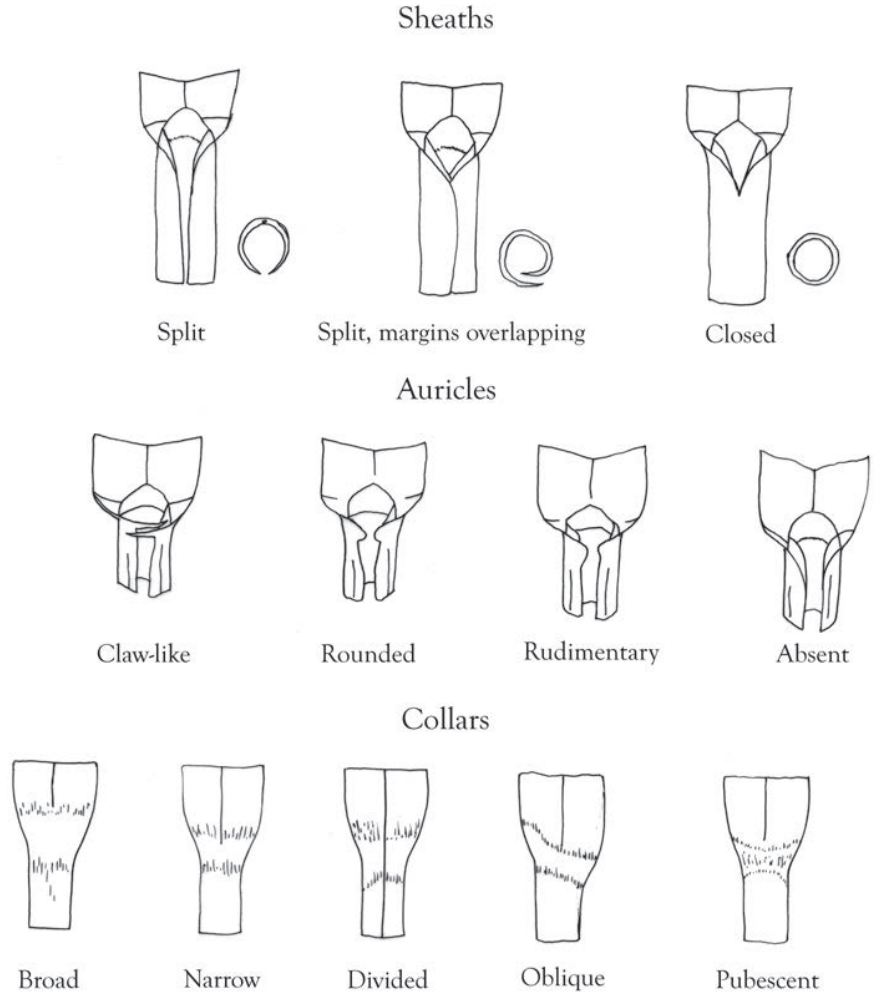


FIGURE 3. Types of sheaths, auricles, and collars.

LIGULES. A ligule is a tissue clasping the stem or bud shoots inside the leaf at the junction of the blade and sheath on the adaxial (adjacent) surface. Ligules are usually present, and they may be simply a fringe of hairs, membranous or hyaline, ciliolate or ciliate membrane, or absent. The length of ligules may vary within a species (Figure 4). The shape and margin are usually quite constant, and they provide reliable distinguishing characteristics for identification.

COLLARS. The collar is found at the junction between the blade and the sheath (Figure 3). It may be vertically broad or narrow, continuous, or divided by a midrib. If the collar extends diagonally it is referred to as oblique. Collars are usually smooth but may be hairy over the whole surface or only on the inner and lowermost portion of the margin. Collars are usually green or yellowish-green and may be tinged with yellow or red.

BLADES. The blade or lamina is the upper portion of the leaf above the collar, ligule, and auricle. There is considerable variation in the length and the width of the blades and the ratio between these two characteristics is useful for identification (Figures 5, 6). Blades are usually linear to lanceolate, but in some species blades are filiform or ovate. There is a great deal of variation among species in the shape of the blade apex and base and hairiness of the upper and lower surfaces and margins. Blade venation is usually parallel, although sometimes there

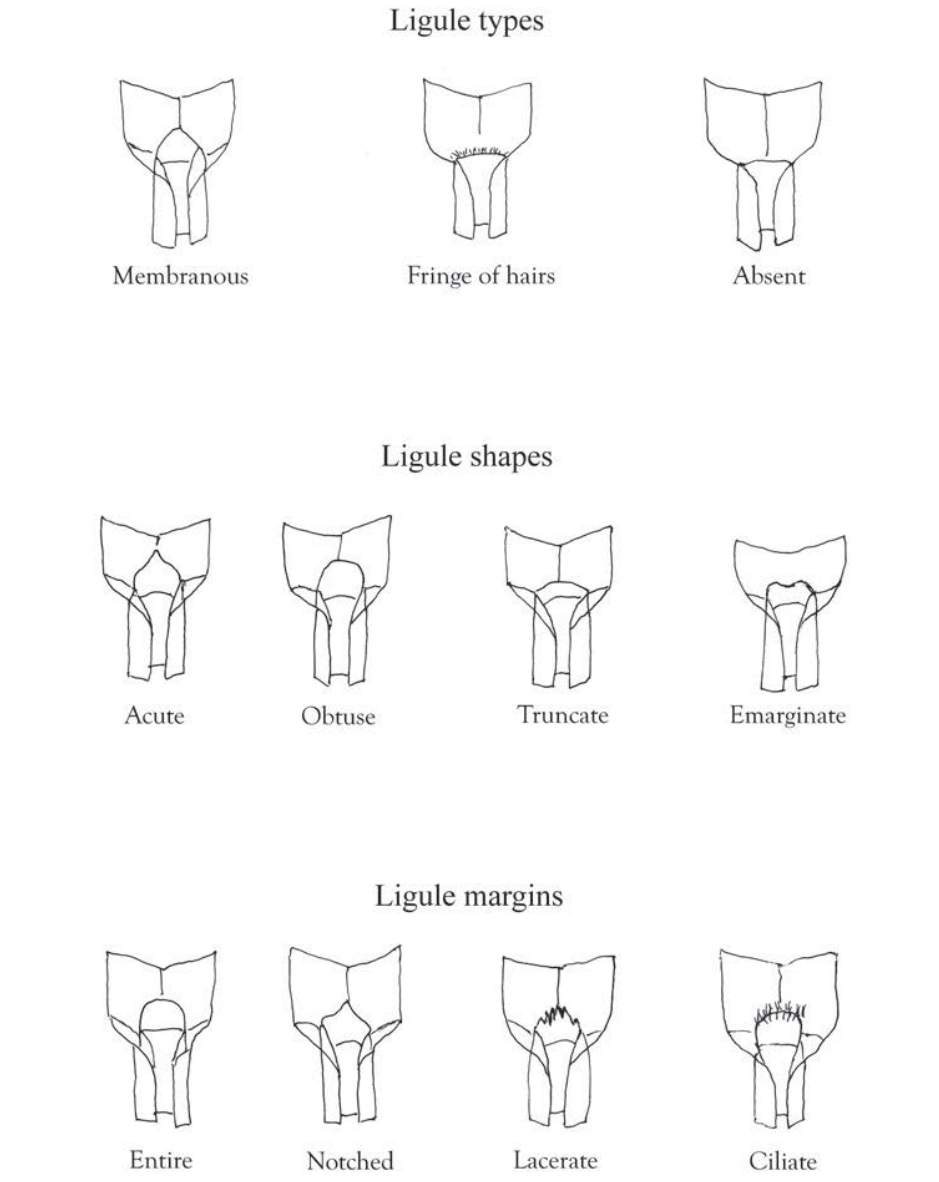


FIGURE 4. Ligule types, shapes, and margins.

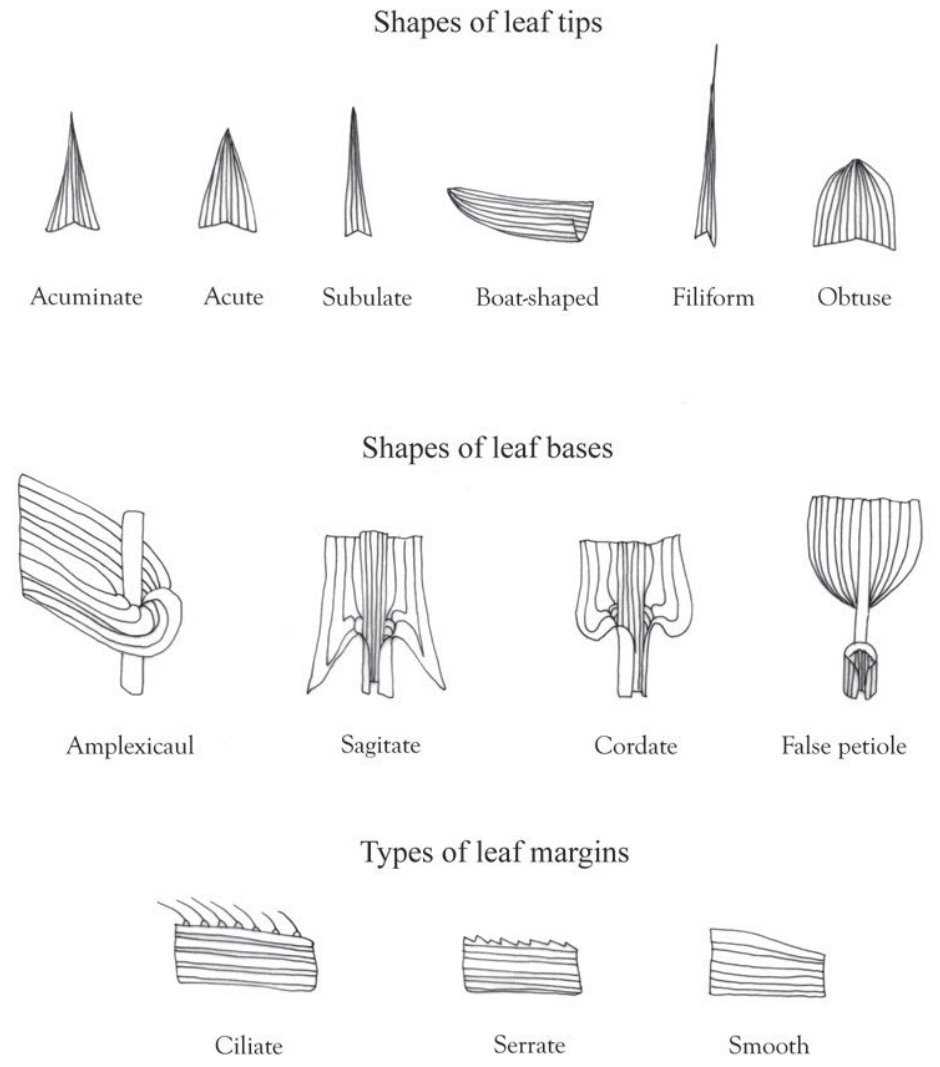


FIGURE 5. Leaf blade apices, bases, and margins.

are evident cross veins. Frequently, there are considerable differences between blades from the upper and lower parts of the same plant and between blades taken from different plants of the same species.

Reproductive Structures. The spikelet is the characteristic floral structure in grasses. In most of the grass species, the inflorescence comprises numerous spikelets that are aligned in different sequences. In this study, the different types of inflorescences, spikelet shapes, and awn types are included. In the vegetative key no reference is made to the detailed spikelet parts.

Inflorescences. Different inflorescence types are distinguished by the presence or absence of pedicels and the branching of the main axis. Aside from the basic forms of a spike, raceme, and panicle, there are many subtypes (Figures 7, 8).

Spikes. In a spike, the spikelets are attached directly (sessile) to the unbranched main axis without pedicels. Most members of the tribe Triticeae have this type of inflorescence.

Racemes. A raceme is an unbranched inflorescence with each spikelet borne on a single pedicel directly on the axis. This type of inflorescence is rare in the grasses, but there are many species in which more than one raceme is found in the inflorescence; this arrangement is then technically referred to as a panicle.

Panicles. An inflorescence in which the main axis has several lateral, whorled, or individual indeterminate branches, each branch terminating in a pedicellate spikelet. A true panicle does not have any leaf sheaths within the inflorescence. A rame is a compound inflorescence in the tribe Andropogoneae consisting

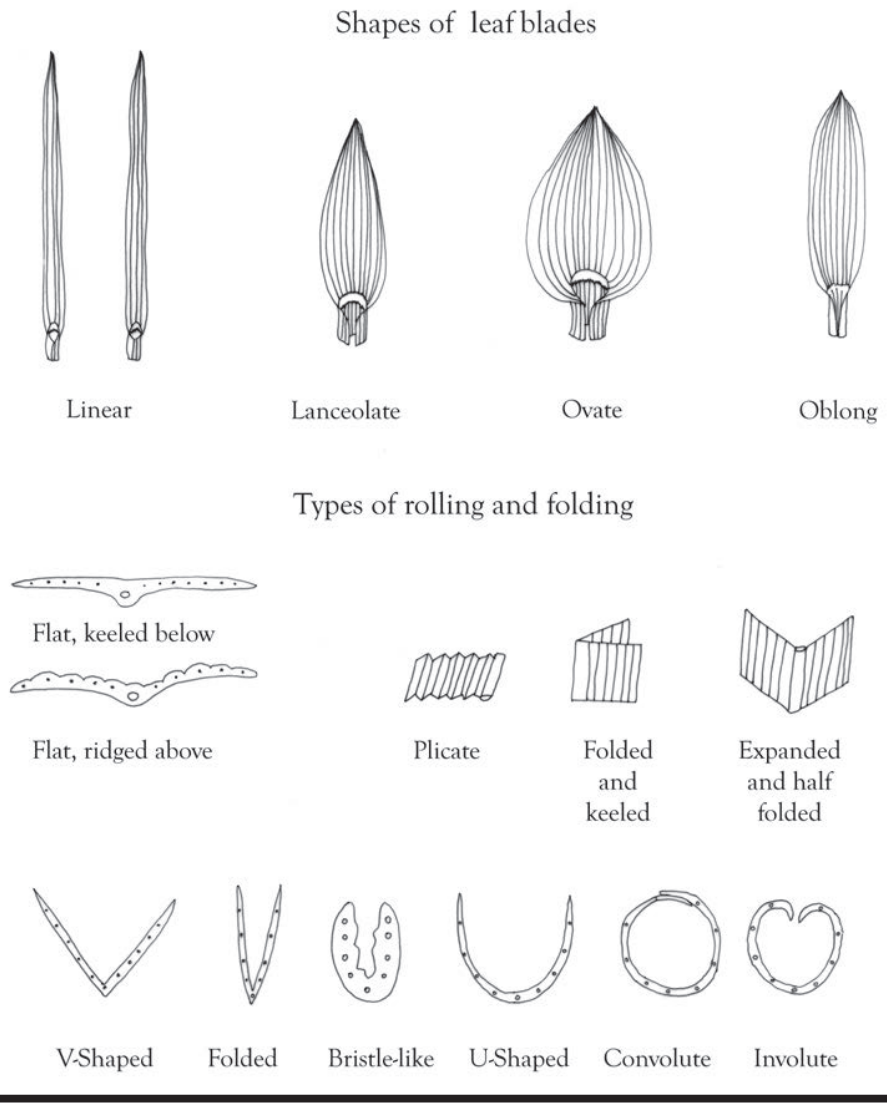


FIGURE 6. Leaf blade characteristics.

of one to many units (branches) of one sessile and one or two pedicellate spikelets. This arrangement is typical of the Andropogoneae, and in many of the older published floras was referred to as "racemes."

Vegetation

The five major vegetation zones in Mali are depicted on a vegetation map (Figure 9). The desert zone in northern Mali has very little vegetation because it lies in the Sahara Desert, which has scant rainfall. Grasses dominate the semidesert, steppe, and brush-grass savannah zones, especially *Cenchrus biflorus*. A global land cover map of Mali indicates 29,737 ha of open to sparse grassland and shrubland, 749 ha of woodland or deciduous forest, 23,508 ha of agriculture, 70,631 ha of bare soil, and only 66 ha of wetlands (Mayaux et al., 2004).

Identification

Descriptions. The grass descriptions were recorded from plant specimens at the United States National Herbarium (US), Department of Botany, National Museum of Natural History, Smithsonian Institution; the Cairo University Herbarium (CAI); and a few specimens on loan from Royal Botanical Gardens, Kew (K), United Kingdom. Information from these specimens was verified with the descriptions of species reported in the references. Each description includes the complete scientific name (with authorities and place of publication) and

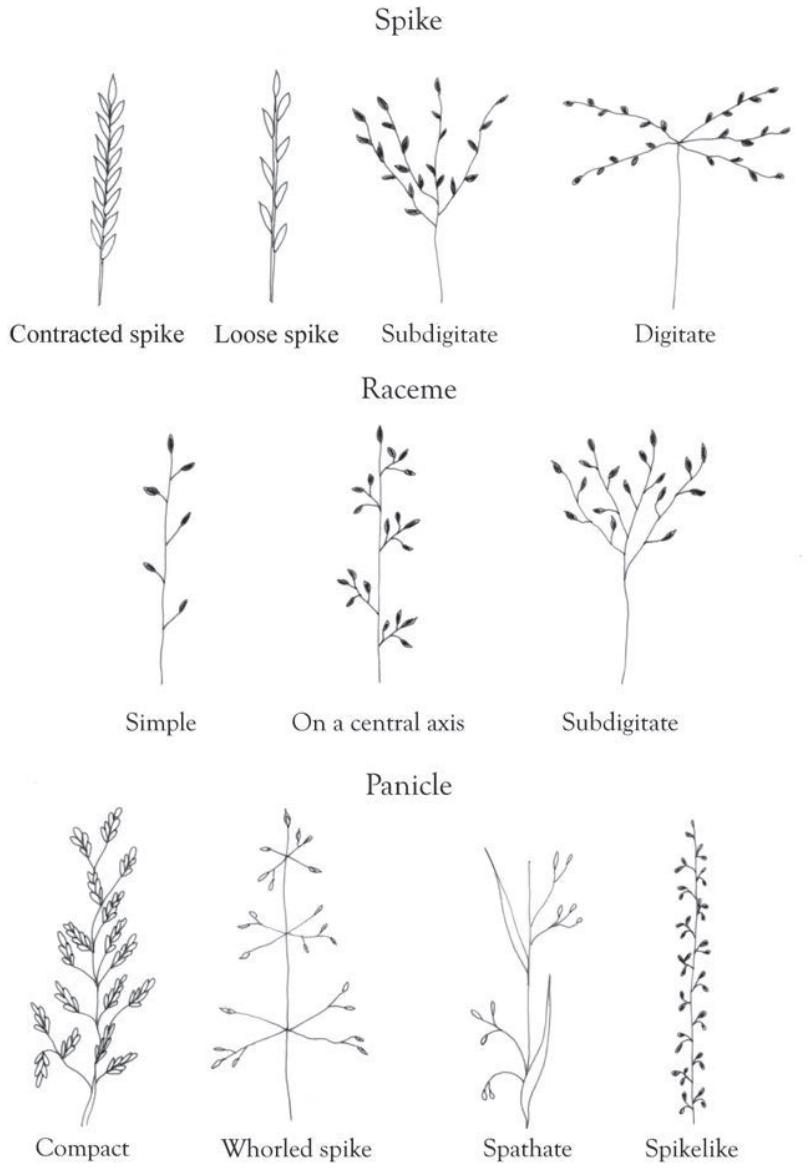


FIGURE 7. Inflorescence types.

common name(s), if known. Introduced species are marked with an asterisk (*), and native species are unmarked.

Illustrations. Plant illustrations used in this study were drawn from herbarium plant specimens and verified against illustrations appearing in serveral references. Several illustrations were redrawn from Ibrahim and Kabuye (1988) after observing Bogdan's plant collection at the National Agriculture Research Station (NARS), Kitale, Kenya, in 1985.

Because this publication deals only with grasses, it is necessary to differentiate between true grasses and other grasslike species, which can be confused in natural conditions. True grasses belong to the grass family *Poaceae* and not the sedge family (*Cyperaceae*) or the rush family (*Juncaceae*). Their leaves are two-ranked and arise at solid conspicuous nodes along hollow stems (culms), which are circular in cross section. A leaf comprises a blade and a sheath surrounding the culm and open down the side in most cases to the base. Commonly, the top of the sheath has a membranous projection (ligule) pressed against the culm. Sometimes the ligule is represented by a fringe of hairs or a shallow rim. In other cases, it is absent. In contrast to grasses, the majority of sedges have solid stems that are mostly triangular in cross section. The base of the leaf usually forms a closed sheath

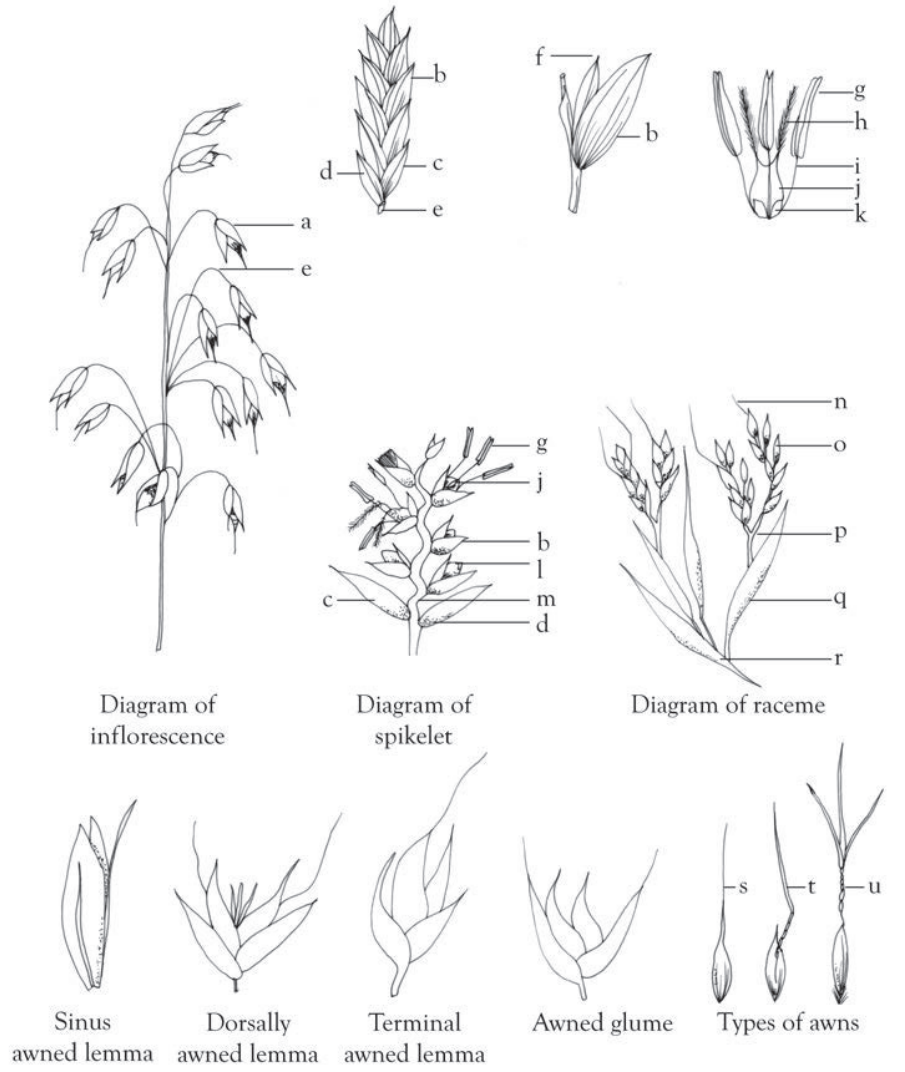


FIGURE 8. Inflorescence and spikelet characteristics: a. spikelet; b. lemma; c. upper glume; d. lower glume; e. pedicel; f, palea; g, anther; h, stigma; i, filament; j, ovary; k, lodicule; l, grain; m, rachilla; n, awn; o, raceme; p, peduncle; q, spatheole; r, spathe; s, single straight awn; t, single geniculated awn; u, twisted divided awn.

around the stem, and there is no ligule. However, sometimes there is a projection at the top of the sheath, opposite the leaf blade, instead of between the blade and the culm as with grass species. Rushes have solid stems and are usually round in cross section, and the nodes are indistinct. The leaves of rushes are usually three-ranked and usually not stiff, ligules are absent or weakly developed, and auricles are absent.

KEYS. Because we are dealing with 199 grasses in Mali, the keys have been constructed to make use of easily visible characteristics. The only additional aids necessary are a short metric scale graduated in millimeters and a hand lens with a magnification of 10–14×. The identification key is composed of two parts: a key to major groups and then keys to each group. Although many readers are familiar with the use of a dichotomous key, a note on how to use one seems appropriate here. The key contains a series of two contrasting statements. Start with the beginning of the key and read both groups of characteristics in couplet 1. Then decide which group fits the specimen best and note the number following the group. Proceed to the couplet with that number and repeat the process. Read each half of every couplet carefully before deciding which description best fits the specimen. Following this pattern, you will arrive at the stop in the key

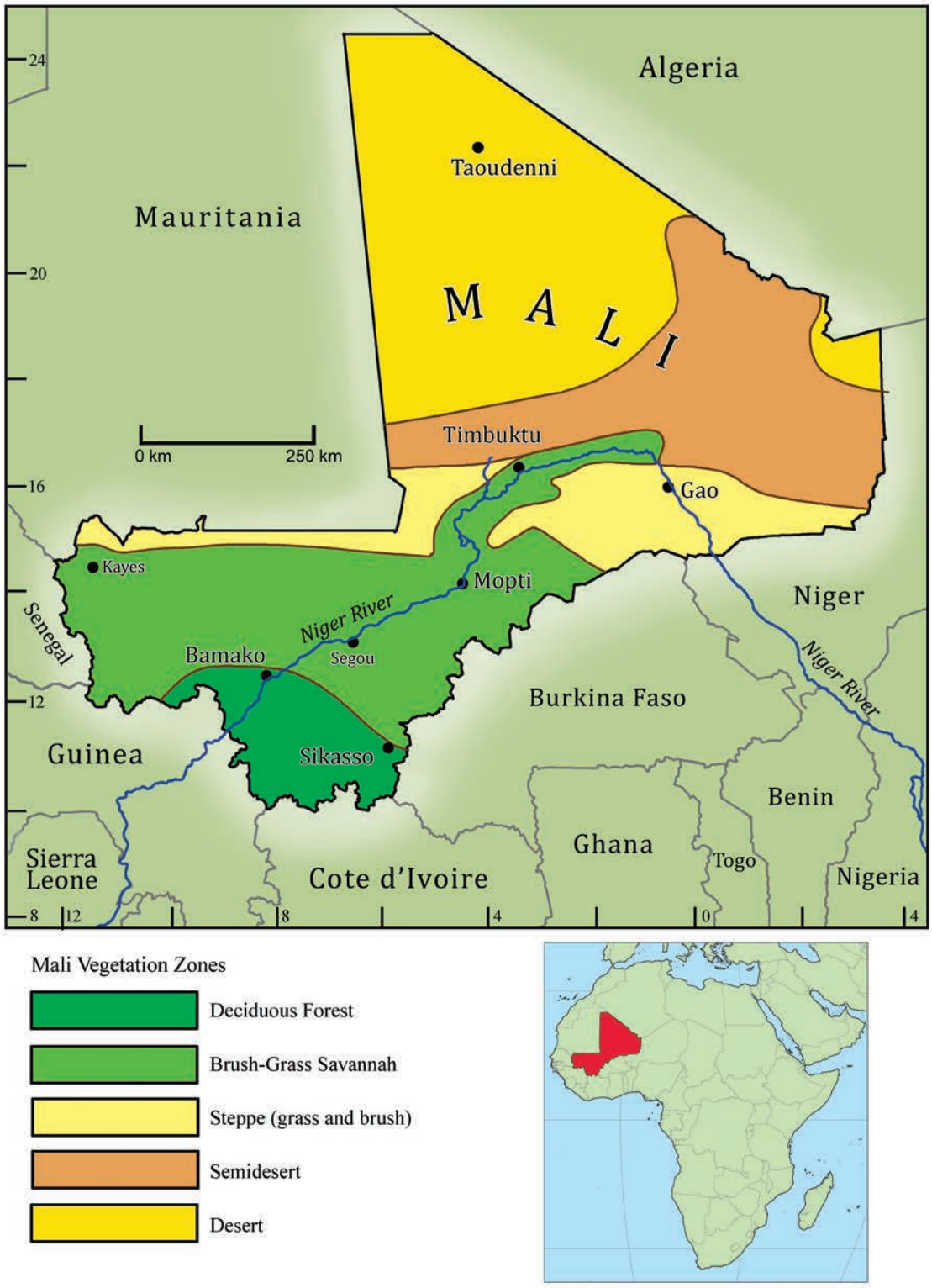


FIGURE 9. Vegetation map of Mali. Redrawn from a map available from the Perry-Castañeda Library Collection by Alice Tangerini.

where a species name appears at the end of a half couplet. Turn to the text for a description and illustration of the species, which are arranged alphabetically. In using the key you may need to refer to the glossary, which immediately follows the descriptions.

Synopsis

The following list is a synopsis of the classification of the genera into subfamily, tribe, and subtribe for the grasses of Mali.

- Subfamily Aristidoideae
  - Tribe Aristideae: *Aristida, Stipagrostis*
- Subfamily Arundinoideae
  - Tribe Molinieae
    - Subtribe Crinipinae: *Elytrophorus*
    - Subtribe Molininae: *Phragmites*
- Subfamily Bambusoideae
  - Tribe Bambuseae
    - Subtribe Bambusinae: *Bambusa, Oxytenanthera*
- Subfamily Chloridoideae
  - Tribe Cynodonteae
    - Subtribe Cteniinae: *Ctenium*
    - Subtribe Dactylocteniinae: *Acrachne, Dactyloctenium*
    - Subtribe Eleusininae: *Chloris, Chrysochloa, Coelachyrum, Cynodon, Dinebra, Eleusine, Micrachne, Microchloa, Schoenefeldia, Stapfochloa, Tetrapogon*
    - Subtribe Hubbardochloinae: *Leptothrium*
    - Subtribe Tripogoninae: *Oropetium, Tripogonella*
    - Subtribe Traginae: *Tragus*
  - Tribe Eragrostideae
    - Subtribe Cotteinae: *Enneapogon*
    - Subtribe Eragrostidinae: *Eragrostis*
  - Tribe Zoysieae
    - Subtribe Sporobolinae: *Sporobolus*
- Subfamily Oryzoideae
  - Tribe Oryzeae
    - Subtribe Oryzinae: *Leersia, Oryza*
- Subfamily Panicoideae
  - Tribe Andropogoneae: *Chrysopogon, Sehima*
    - Subtribe Andropogoninae: *Anadelphia, Andropogon, Cymbopogon, Dichanthium, Diectomis, Diheteropogon, Elymandra, Hyparrhenia, Hyperthelia, Parahyparrhenia, Schizachyrium, Themeda*
    - Subtribe Arthraxoninae: *Arthraxon*
    - Subtribe Coicinae: *Coix*
    - Subtribe Ischaeminae: *Ischaemum*
    - Subtribe Rottboelliinae: *Hackelochloa, Hemarthria, Lasiurus, Rottboellia*
    - Subtribe Saccharinae: *Euclasta, Imperata, Sorghastrum, Sorghum*
    - Subtribe Tripsacinae: *Elionurus, Rhytachne, Urelytrum, Vossia, Zea*
  - Tribe Arundinelleae: *Arundinella*
  - Tribe Paniceae: *Sacciolepis, Trichanthecium*
    - Subtribe Anthephorinae: *Anthephora*, *Digitaria*
    - Subtribe Boivinellinae: *Acroceras*, *Alloteropsis*, *Echinochloa, Oplismenus*
    - Subtribe Cenchrinae: *Cenchrus, Setaria*
    - Subtribe Melinidinae: *Eriochloa, Tricholaena*, *Urochloa*
    - Subtribe Panicinae: *Panicum*
  - Tribe Paspaleae
    - Subtribe Paspalinae: *Paspalum*
  - Tribe Tristachyideae: *Dilophotriche Loudetia, Loudetiopsis, Tristachya*
- Subfamily Pooideae
  - Tribe Triticeae: *Triticum*
  - Tribe Poeae
    - Subtribe Aveninae: *Avena*

Acknowledgments

We thank the United States National Herbarium, Department of Botany, National Museum of Natural History, Smithsonian Institution for allowing the first author work space; the staff of Cairo University Herbarium in Giza; Robert J. Soreng at the United States National Herbarium for providing valuable information from the *Catalogue of New World Grasses* (Poaceae). We thank also Kitt Repass for preparing the illustrations and revising a few initial drawings made by Dhan Bhandari, Magdalena Sundnik, H. Nevin, and Margaret Moss. In addition, we give special thanks to Magen Nishida and James Harle for their extensive help with Photoshop. The authors are especially grateful to the illustrator Alice Tangerini for her help with Photoshop, to Department of Botany Librarian Robin Everly for help in searching for references and to Nahed Elhusseini and Maria Vorontsova for their many helpful comments that improved the manuscript.

Vegetative Key to the Grasses of Mali

1a. Culms bamboo, woody or reedlike . . . . . Group 1
1b. Culms not bamboo, woody or reedlike 2
2a. Plants mat forming . . . . . Group 2
2b. Plants not mat forming 3
3a. Auricles present . . . . . Group 3
3b. Auricles not present 4
4a. Stolons present . . . . . Group 4
4b. Stolons absent 5
5a. Leaf blade margins cartilaginous . . . . . Group 5
5b. Leaf blade margins not cartilaginous 6
6a. Leaf blade bases cordate or amplexicaul . . . . . Group 6
6b. Leaf blade bases not cordate or amplexicaul 7
7a. Leaf blade apices abruptly acute . . . . . Group 7
7b. Leaf blade apices not abruptly acute 8
8a. Leaf blade apices obtuse . . . . . Group 8
8b. Leaf blade apices not obtuse 9
9a. Leaf blade bases narrower than sheath apex . . . . . Group 9
9b. Leaf blade bases not narrower than sheath apex 10
10a. Culms wiry . . . . . Group 10
10b. Culms not wiry 11
11a. Rhizomes present . . . . . Group 11
11b. Rhizomes absent 12
12a. Culm nodes hairy . . . . . Group 12
12b. Culm nodes not hairy 13
13a. Culm lower nodes rooting . . . . . Group 13
13b. Culm lower nodes not rooting 14
14a. Oral hair ciliate . . . . . Group 14
14b. Oral hair not ciliate 15
15a. Leaf blade apices attenuate or filiform . . . . . Group 15
15b. Leaf blade apices not attenuate or filiform 16
16a. Leaf blade midrib conspicuous . . . . . Group 16
16b. Leaf blade midrib not conspicuous 17
17a. Ligules a fringe of hairs . . . . . Group 17
17b. Ligules not a fringe of hairs 18
18a. Ligules eciliate membrane . . . . . Group 18
18b. Ligules ciliate membrane 19

GROUP 1. CULMS BAMBOO, WOODY OR REEDLIKE

1a. Bamboo 2
1b. Not bamboo 3
2a. Auricles present . . . . . (30) ***Bambusa vulgaris***
2b. Auricles absent . . . . . (128) ***Oxytenanthera abyssinica***
3a. Culms reedlike 4
3b. Culms woody not reedlike 7
4a. Ligules ciliate membrane . . . . . (140) ***Phragmites karka***
4b. Ligules not ciliate membrane 5
5a. Ligules eciliate membrane . . . . . (51) ***Cymbopogon caesius***
5b. Ligules a fringe of hairs 6
6a. Rhizomes present . . . . . (77) ***Echinochloa pyramidalis***
6b. Rhizomes absent . . . . . (115) ***Loudetia phragmitoides***
7a. Lower nodes rooting . . . . . (88) ***Eragrostis barteri***
7b. Lower nodes not rooting 8
8a. Leaf blades coriaceous, stiff, apex pungent . . . . . (136) ***Panicum turgidum***
8b. Leaf blades soft, apex not pungent . . . . . (25) ***Aristida sieberiana***

GROUP 2. MAT FORMING

1a. Leaf blades lanceolate/ovate . . . . . (27) ***Arthraxon lancifolius***
1b. Leaf blades linear 2
2a. Leaf blades convolute, apex pungent . . . . . (170) ***Sporobolus spicatus***
2b. Leaf blades conduplicate or flat surface, apex not pungent 3
3a. Culms spongy . . . . . (198) ***Vossia cuspidata***
3b. Culms not spongy 4
4a. Ligules a fringe of hairs . . . . . (157) ***Setaria geminata***
4b. Ligules not a fringe of hairs 5
5a. Ligules eciliate or ciliolate membranes 6
5b. Ligules not ciliate or ciliolate membranes 7
6a. Rhizomes present . . . . . (53) ***Cynodon dactylon***
6b. Rhizomes absent . . . . . (54) ***Dactyloctenium aegyptium***
7a. Culms lower nodes rooting . . . . . (139) ***Paspalum scrobiculatum***
7b. Culms lower nodes not rooting 8
8a. Ligules apices acute, leaf blades flat linear . . . . . (69) ***Digitaria longiflora***
8b. Ligules apices erose, leaf blades involute . . . . . (122) ***Oropetium aristatum***

GROUP 3. AURICLE PRESENT

1a. Leaf blade bases with false petiole . . . . . (126) ***Oryza longistaminata***
1b. Leaf blade bases without false petiole 2
2a. Culms lower nodes rooting 3
2b. Culms lower nodes not rooting 4
3a. Culms spongy . . . . . (124) ***Oryza barthii***
3b. Culms not spongy . . . . . (125) ***Oryza brachyantha***
4a. Ligules acute or acuminate . . . . . (127) ***Oryza sativa***
4b. Ligules not acute or acuminate 5
5a. Leaf blades chartaceous, plicated . . . . . (185) ***Triticum aestivum***
5b. Leaf blades not chartaceous, plicated 6
6a. Rhizomes present, short . . . . . (105) ***Hyparrhenia cyanescens***
6b. Rhizomes absent 7
7a. Oral hairs ciliate . . . . . (7) ***Andropogon canaliculatus***
7b. Oral hairs lacking 8
8a. Auricles continuous with ligules . . . . . (138) ***Parahyparrhenia annua***

8b. Auricles not continuous with ligules 9
9a. Leaf blade bases tapering toward midrib . . . . . (8) ***Andropogon chevalieri***
9b. Leaf blade bases not tapering toward midrib 10
10a. Leaf blade margins glabrous . . . . . (108) ***Hyperthelia dissoluta***
10b. Leaf blade margins scabrous 11
11a. Ligules erose, leaf blade apices filiform . . . . . (13) ***Andropogon pseudapricus***
11b. Ligules lacerate, leaf blade apices acute . . . . . (12) ***Andropogon perligulatus***

GROUP 4. STOLONS PRESENT

1a. Rhizomes present, elongated . . . . . (134) ***Panicum repens***
1b. Rhizomes absent 2
2a. Leaf blade surfaces and margins hairy . . . . . (191) ***Urochloa mutica***
2b. Leaf blade surfaces and margins not hairy 3
3a. Culms prostrate . . . . . (104) ***Hemarthria altissima***
3b. Culms not prostrate 4
4a. Ligules eciliate membranes 5
4b. Ligules not eciliate membranes 6
5a. Ligules lacerate . . . . . (55) ***Dichanthium annulatum***
5b. Ligules acute . . . . . (70) ***Digitaria nuda***
6a. Ligules ciliate membranes 7
6b. Ligules a fringe of hairs 8
7a. Leaf blade apices attenuate . . . . . (39) ***Chloris gayana***
7b. Leaf blade apices obtuse . . . . . (43) ***Chrysochloa hindsii***
8a. Culms lower nodes rooting . . . . . (194) ***Urochloa stigmatisata***
8b. Culms lower nodes not rooting 9
9a. Leaf blades spreading, convolute . . . . . (173) ***Stipagrostis acutiflora***
9b. Leaf blades ascending, conduplicate . . . . . (166) ***Sporobolus ioclados***

GROUP 5. LEAF BLADE MARGIN CARTILAGINOUS

1a. Culms prostrate . . . . . (59) ***Digitaria aristulata***
1b. Culms not prostrate 2
2a. Leaf blade bases cordate . . . . . (190) ***Urochloa lata***
2b. Leaf blade bases not cordate 3
3a. Ligules eciliate membranes . . . . . (15) ***Anthephora pubescens***
3b. Ligules ciliate membranes or a fringe of hairs 4
4a. Leaf blades filiform, wiry . . . . . (1) ***Acrachne racemosa***
4b. Leaf blades not filiform, wiry 5
5a. Ligules ciliate membranes . . . . . (64) ***Digitaria delicata***
5b. Ligules a fringe of hairs 6
6a. Leaf blade margins glabrous . . . . . (166) ***Sporobolus ioclados***
6b. Leaf blade margins not glabrous 7
7a. Culm lower nodes rooting . . . . . (194) ***Urochloa stigmatisata***
7b. Culm lower nodes not rooting 8
8a. Leaf blade bases broadly rounded . . . . . (3) ***Alloteropsis paniculata***
8b. Leaf blade bases tapering toward midrib . . . . . (196) ***Urochloa villosa***

GROUP 6. LEAF BLADE BASES CORDATE OR AMPLEXICAULE

1a. Culms prostrate, wiry . . . . . (131) ***Panicum callosum***
1b. Culms not prostrate, not wiry 2
2a. Ligules ciliate or ciliolate membranes . . . . . (103) ***Hackelochloa granularis***
2b. Ligules not ciliate or ciliolate membranes 3
3a. Ligules a fringe of hairs 4

3b. Ligules not a fringe of hairs 5
4a. Nodes pubescent . . . . . (195) ***Urochloa trichopus***
4b. Nodes glabrous . . . . . (32) ***Cenchrus biflorus***
5a. Culm lower nodes rooting . . . . . (2) ***Acroceras amplectens***
5b. Culm lower nodes not rooting 6
6a. Leaf blade apices attenuate, culms with prop roots . . . . . (51) ***Cymbopogon caesius***
6b. Leaf blade apices attenuate, culms without prop roots 7
7a. Leaf blades lanceolate, ligule truncate . . . . . (47) ***Coix lacryma-jobi***
7b. Leaf blades linear, ligule obtuse . . . . . (72) ***Diheteropogon hagerupii***

GROUP 7. LEAF BLADE APEX ABRUPTLY ACUTE

1a. Culms wiry . . . . . (120) ***Microchloa indica***
1b. Culms not wiry 2
2a. Leaf blade bases narrower than sheath apex . . . . . (6) ***Andropogon africanus***
2b. Leaf blade bases the same width as sheath apex 3
3a. Culms robust prop rooted, leaf blades sharply scabrid . . . . . (151) ***Schizachyrium ruderale***
3b. Culms not robust nor prop rooted, leaf blades smooth to finely scabrid 4
4a. Culm internodes elliptical in section, blades conduplicate . . . . . (80) ***Eleusine indica***
4b. Culm internodes not elliptical in section, blades flat . . . . . (153) ***Schizachyrium sanguineum***

GROUP 8. LEAF BLADE APEX OBTUSE

1a. Ligules eciliate membranes 2
1b. Ligules not eciliate membranes 3
2a. Culm nodes pubescent . . . . . (28) ***Arundinella nepalensis***
2b. Culm nodes glabrous . . . . . (147) ***Schizachyrium brevifolium***
3a. Leaf blade margins pubescent, perennials . . . . . (123) ***Oropetium capense***
3b. Leaf blade margins glabrous, annuals 4
4a. Leaf blades spreading, sheath surfaces glabrous . . . . . (176) ***Tetrapogon cenchriformis***
4b. Leaf blades ascending, sheath surfaces scabrous . . . . . (120) ***Microchloa indica***

GROUP 9. LEAF BLADE BASE NARROWER THAN SHEATH APEX

1a. Leaf blades plicate . . . . . (156) ***Setaria barbata***
1b. Leaf blades not plicate 2
2a. Rhizomes present . . . . . (105) ***Hyparrhenia cyanescens***
2b. Rhizomes absent 3
3a. Oral hairs ciliate . . . . . (22) ***Aristida mutabilis***
3b. Oral hair lacking 4
4a. Leaf blades lanceolate . . . . . (14) ***Andropogon tectorum***
4b. Leaf blades linear or filiform 5
5a. Leaf blades conduplicate . . . . . (146) ***Sacciolepis micrococca***
5b. Leaf blades flat 6
6a. Leaf blade apices attenuate . . . . . (155) ***Sehima ischaemoides***
6b. Leaf blade apices acute 7
7a. Ligules eciliate membranes 8
7b. Ligules ciliate membranes 9
8a. Leaf sheath surfaces glabrous . . . . . (137) ***Panicum walense***
8b. Leaf sheath surfaces hairy . . . . . 117) ***Loudetia simplex***
9a. Leaf blade apex acuminate . . . . . (13) ***Andropogon pseudapricus***
9b. Leaf blade apices acute 10
10a. Culms unbranched, ligule apices acute . . . . . (10) ***Andropogon gayanus***
10b. Culms branched, ligule apices erose . . . . . (57) ***Diectomis fastigiata***

GROUP 10. CULMS WIRY

1a. Culm lower nodes rooting 2
1b. Culm lower nodes not rooting 3
2a. Culms prostrate, leaf blade margins hairy . . . . . (181) ***Trichanthecium parvifolium***
2b. Culms decumbent, leaf blade margins glabrous . . . . . (68) ***Digitaria leptorachis***
3a. Culm nodes pubescent . . . . . (84) ***Enneapogon persicus***
3b. Culm nodes glabrous 4
4a. Ligules eciliate membranes 5
4b. Ligule a fringe of hairs or ciliate membrane 6
5a. Leaf blade apex acuminate . . . . . (49) ***Ctenium newtonii***
5b. Leaf blade apex acute . . . . . (130) ***Panicum antidotale***
6a. Culm internodes hairy, leaf sheath keeled . . . . . (33) ***Cenchrus ciliaris***
6b. Culm internodes glabrous, leaf sheath not keeled 7
7a. Rhizomes present . . . . . (165) ***Sporobolus helvolus***
7b. Rhizomes absent 8
8a. Ligule a fringe of hairs 9
8b. Ligule not fringe of hairs 10
9a. Leaf blades filiform . . . . . (23) ***Aristida recta***
9b. Leaf blades linear . . . . . (113) ***Leptothrium senegalense***
10a. Leaf blades spreading, culms geniculately ascending . . . . . (56) ***Dichanthium foveolatum***
10b. Leaf blades ascending, culms erect 11
11a. Leaf blade apices pungent . . . . . (19) ***Aristida funiculata***
11b. Leaf blade apices not pungent 12
12a. Leaf sheath surfaces glabrous, perennials . . . . . (183) ***Tripogonella minima***
12b. Leaf sheath surfaces scabrous, annuals . . . . . (120) ***Microchloa indica***

GROUP 11. RHIZOMES PRESENT

1a. Rhizomes scaly . . . . . (111) ***Lasiurus scindicus***
1b. Rhizomes not scaly 2
2a. Culms wiry, internodes hairy . . . . . (33) ***Cenchrus ciliaris***
2b. Culms not wiry, internodes not hairy 3
3a. Culm internodes solid . . . . . (106) ***Hyparrhenia rufa***
3b. Culm internodes not solid 4
4a. Leaf blades distichous, coriaceous . . . . . (134) ***Panicum repens***
4b. Leaf blades not distichous or coriaceous 5
5a. Leaf blade apex hardened, almost pungent . . . . . (132) ***Panicum fluviicola***
5b. Leaf blade apex not hardened 6
6a. Leaf blade apex attenuate or filiform 7
6b. Leaf blade apex not attenuate or filiform 8
7a. Ligules eciliate membranes . . . . . (112) ***Leersia hexandra***
7b. Ligules a fringe of hairs . . . . . (184) ***Tristachya superba***
8a. Leaf blade margins hairy . . . . . (109) ***Imperata cylindrica***
8b. Leaf blade margins not hairy 9
9a. Ligules ciliate membranes 10
9b. Ligules not ciliate membrane 11
10a. Leaf blade bases narrower than sheath apex . . . . . (129) ***Panicum anabaptistum***
10b. Leaf blade bases broadly rounded . . . . . (145) ***Sacciolepis chevalieri***
11a. Culm nodes pubescent . . . . . (110) ***Ischaemum polystachyum***
11b. Culm nodes not pubescent 12
12a. Culms spongy 13
12b. Culms not spongy 14

13a. Ligules fringe of hairs . . . . . (78) ***Echinochloa stagnina***
13b. Ligule eciliate membrane . . . . . (144) ***Sacciolepis africana***
14a. Collars white in color . . . . . (159) ***Setaria sphacelata*** **var.** ***anceps***
14b. Collars not white in color 15
15a. Ligules eciliate membranes . . . . . (161) ***Sorghastrum stipoides***
15b. Ligules not eciliate membranes 16
16a. Culms very slender, awns straight . . . . . (44) ***Chrysopogon fulvibarbis***
16b. Culms somewhat spreading, awns flexuous . . . . . (45) ***Chrysopogan nigritanus***

GROUP 12. CULM NODES HAIRY

1a. Culm lower nodes rooting . . . . . (63) ***Digitaria delicatula***
1b. Culm lower nodes not rooting 2
2a. Culm internodes hairy 3
2b. Culm internodes not hairy 4
3a. Culms erect . . . . . (55) ***Dichanthium annulatum***
3b. Culms decumbent . . . . . (20) ***Aristida hordeacea***
4a. Ligules eciliate membrane 5
4b. Ligules not eciliate membranes 6
5a. Culms geniculately ascending . . . . . (60) ***Digitaria barbinodis***
5b. Culms erect . . . . . (81) ***Elionurus elegans***
6a. Leaf blade bases broadly rounded . . . . . (195) ***Urochloa trichopus***
6b. Leaf blade bases not broadly rounded 7
7a. Leaf blades lanceolate/linear . . . . . (192) ***Urochloa orthostachys***
7b. Leaf blades not lanceolate/linear 8
8a. Ligules a fringe of hairs 9
8b. Ligules not fringe of hairs 10
9a. Leaf blades flat . . . . . (169) ***Sporobolus pyramidalis***
9b. Leaf blades involute . . . . . (118) ***Loudetiopsis kerstingii***
10a. Leaf blades flaccid . . . . . (66) ***Digitaria fragilis***
10b. Leaf blades not flaccid 11
11a. Leaf blade surfaces scarbid . . . . . (24) ***Aristida rhiniochloa***
11b. Leaf blade surfaces not scarbid 12
12a. Leaf blade bases narrowed, butt sheaths woolly . . . . . (116) ***Loudetia simplex***
12b. Leaf blade bases barely rounded, butt sheaths not woolly 13
13a. Leaf sheaths glabrous, perennials . . . . . (177) ***Themeda triandra***
13b. Leaf sheaths involute . . . . . (114) ***Loudetia hordeiformis***

GROUP 13. CULM LOWER NODES ROOTING

1a. Culm internodes elliptical in section . . . . . (79) ***Eleusine africana***
1b. Culm internodes not elliptical in section 2
2a. Leaf blades ribbed or plicate . . . . . (156) ***Setaria barbata***
2b. Leaf blades not ribbed or plicate 3
3a. Basal innovation present, subterete or flabellate . . . . . (42) ***Chloris virgata***
3b. Basal innovation absent 4
4a. Leaf blades ovate, lanceolate 5
4b. Leaf blades not ovate, lanceolate 6
5a. Leaf sheath surfaces glabrous . . . . . (181) ***Trichanthecium parvifolium***
5b. Leaf sheath surfaces hairy . . . . . (121) ***Oplismenus hirtellus***
6a. Ligules a fringe of hairs 7
6b. Ligules not fringe of hairs 8
7a. Leaf sheath margins glabrous, culm nodes dark color . . . . . (187) ***Urochloa arrecta***
7b. Leaf sheath margins hairy, culm nodes not dark color . . . . . (191) ***Urochloa mutica***

8a. Leaf blade margins glabrous . . . . . (16) ***Aristida adscensionis***
8b. Leaf blade margins not glabrous 9
9a. Ligules ciliate membrane 10
9b. Ligules eciliate membrane 11
10a. Leaf sheaths keeled . . . . . (172) ***Stapfochloa lamproparia***
10b. Leaf sheaths not keeled . . . . . (40) ***Chloris pilosa***
11a. Culms prostrate . . . . . (102) ***Euclasta condylotricha***
11b. Culms erect 12
12a. Leaf blades with distinctive white midrib ½ its length . . . . . (58) ***Digitaria acuminatissima***
12b. Leaf blades without distinctive midrib . . . . . (74) ***Dinebra coerulescens***

GROUP 14. ORAL HAIR CILIATE

1a. Ligules eciliate membranes 2
1b. Ligules ciliate membranes or a fringe of hairs 4
2a. Leaf blade bases narrower than sheath apex . . . . . (7) ***Andropogon canaliculatus***
2b. Leaf blade bases not narrower than sheath apex 3
3a. Ligules 6–8 mm long . . . . . (29) ***Avena sativa***
3b. Ligule 3 mm long or less . . . . . (107) ***Hyparrhenia subplumosa***
4a. Leaf blade margins glandular . . . . . (89) ***Eragrostis cilianensis***
4b. Leaf blade margins not glandular 5
5a. Leaf blade apices pungent . . . . . (173) ***Stipagrostis acutiflora***
5b. Leaf blade apices not pungent 6
6a. Leaf blade base cordate . . . . . (32) ***Cenchrus biflorus***
6b. Leaf blade base not cordate 7
7a. Culms usually 1–3 m tall, robust 8
7b. Culms usually less than 1 m tall, not robust 9
8a. Culms solitary, ligules ciliate membrane . . . . . (163) ***Sorghum bicolor***
8b. Culms caespitose, ligules fringe of hairs . . . . . (31) ***Cenchrus americanus***
9a. Ligules a fringe of hairs 10
9b. Ligules not a fringe of hairs 11
10a. Leaf blades spreading, margins glabrous . . . . . (21) ***Aristida kunthiana***
10a. Leaf blades ascending, margins scabrous . . . . . (26) ***Aristida stipoides***
11a. Basal innovations present . . . . . (186) ***Urelytrum muricatum***
11a. Basal innovations absent 12
12a. Leaf blade apex attenuate/filiform 13
12b. Leaf blade apex acuminate 14
13a. Culms erect, collars whitein color . . . . . (82) ***Elymandra androphila***
13b. Culms geniculately ascending, collars not white in color . . . . . (91) ***Eragrostis gangetica***
14a. Leaf blade margins scabrous 15
14b. Leaf blade margins glabrous 16
15a. Leaf sheath slightly compressed, ribbed, flaccid . . . . . (90) ***Eragrostis ciliaris***
15a. Leaf sheath not compressed, not ribbed, stiff . . . . . (85) ***Eragrostis aegyptiaca***
16a. Perennials, leaf blades apex attenuate . . . . . (87) ***Eragrostis atrovirens***
16a. Annuals, leaf blades apex acuminate 17
17a. Ligules less than 0.5 mm long, culms slender . . . . . (98) ***Eragrostis tenella***
17b. Ligules 1–2 mm long, culms not slender . . . . . (94) ***Eragrostis pilosa***

GROUP 15. LEAF BLADE APEX ATTENUATE OR FILIFORM

Ligules fringe of hairs . . . . . SUBGROUP A
Ligules membrane . . . . . SUBGROUP B
Ligules ciliate or ciliolate membrane . . . . . SUBGROUP C

SUBGROUP 15A

1a. Leaf blades spreading . . . . . (175) ***Stipagrostis uniplumis***
1b. Leaf blades not spreading 2
2a. Collars white color . . . . . (168) ***Sporobolus pectinellus***
2b. Collars not white color . . . . . (164) ***Sporobolus festivus***

SUBGROUP 15B

1a. Leaf blades chartaceous . . . . . (52) ***Cymbopogon schoenanthus***
1b. Leaf blades not chartaceous 2
2a. Collars white color, perennials . . . . . (82) ***Elymandra androphila***
2b. Collars not white color, annuals 3
3a. Culms robust with prop roots . . . . . (51) ***Cymbopogon caesius***
3b. Culms not robust and without prop roots 4
4a. Culms erect, slender . . . . . (135) ***Panicum tenellum***
4b. Culms geniculately ascending, not slender 5
5a. Leaf sheath margins hairy, blade margins scabrous . . . . . (48) ***Ctenium elegans***
5b. Leaf sheath margins glabrous, blade margins glabrous . . . . . (50) ***Ctenium villosum***

SUBGROUP 15C

1a. Leaf sheaths keeled . . . . . (21) ***Aristida hordeacea***
1b. Leaf sheaths not keeled 2
2a. Leaf sheath surfaces hairy . . . . . (4) ***Anadelphia afzeliana***
2b. Leaf sheath surfaces not hairy 3
3a. Leaf blades spreading . . . . . (97) ***Eragrostis tremula***
3b. Leaf blades ascending 4
4a. Leaf blades chartaceous . . . . . (154) ***Schoenefeldia gracilis***
4b. Leaf blades not chartaceous 5
5a. Leaf blades coriaceous . . . . . (96) ***Eragrostis prolifera***
5b. Leaf blades not coriaceous 6
6a. Leaf blade surfaces hairy . . . . . (11) ***Andropogon ivorensis***
6b. Leaf blade surfaces not hairy 7
7a. Leaf blade surfaces puberulous . . . . . (142) ***Rhytachne triaristata***
7b. Leaf blade surfaces not puberulous 8
8a. Leaf blade margins scabrous . . . . . (40) ***Chloris pilosa***
8b. Leaf blade margins glabrous 9
9a. Leaf sheath ribbed . . . . . (141) ***Rhytachne rottboellioides***
9b. Leaf sheath not ribbed 10
10a. Collars white color . . . . . (87) ***Eragrostis atrovirens***
10b. Collars not white color 11
11a. Leaf blades involute . . . . . (119) ***Micrachne obtusiflora***
11b. Leaf blades not involute 12
12a. Leaf blades conduplicate . . . . . (146) ***Sacciolepis micrococca***
12b. Leaf blades not conduplicate 13
13a. Culms slender . . . . . (18) ***Aristida diminuta***
13b. Culms not slender . . . . . (17) ***Aristida cumingiana*** **var.** ***uniseta***

GROUP 16. LEAF BLADE MIDRIB CONSPICUOUS

1a. Ligules absent . . . . . (76) ***Echinochloa colona***
1b. Ligules present 2
2a. Leaf blades spreading . . . . . (86) ***Eragrostis aspera***
2b. Leaf blades not spreading 3

3a. Ligules ciliate membrane . . . . . (148) ***Schizachyrium exile***
3b. Ligules not ciliate membrane 4
4a. Leaf blade margins glabrous, ligules apex erose . . . . . (108) ***Hyperthelia dissoluta***
4b. Leaf blade margins scabrous, ligules apex acute 5
5a. Ligules eciliate membrane . . . . . (62) ***Digitaria debilis***
5b. Ligules a fringe of hairs 6
6a. Leaf sheath margins glabrous . . . . . (117) ***Loudetia togoensis***
6b. Leaf sheath margins hairy . . . . . (188) ***Urochloa deflexa***

GROUP 17. LIGULES FRINGE OF HAIRS

1a. Leaf blades conduplicate . . . . . (75) ***Echinochloa callopus***
1b. Leaf blades not conduplicate 2
2a. Leaf sheaths conspicuously keeled . . . . . (37) ***Cenchrus prieurii***
2b. Leaf sheaths not conspicuously keeled 3
3a. Butt sheaths investing base of culm . . . . . (164) ***Sporobolus festivus***
3b. Butt sheaths not investing base of culm 4
4a. Leaf sheath ribbed 5
4b. Leaf sheath not ribbed 6
5a. Leaf blades linear . . . . . (92) ***Eragrostis japonica***
5b. Leaf blades filiform . . . . . (174) ***Stipagrostis hirtigluma***
6a. Leaf blades chartaceous, margins hairy 7
6b. Leaf blades not chartaceous, not hairy 8
7a. Leaf blades lanceolate . . . . . (178) ***Tragus berteronianus***
7b. Leaf blades linear/lanceolate . . . . . (179) ***Tragus racemosus***
8a. Culms slender 9
8b. Culms not slender 10
9a. Culm nodes dark color, perennials . . . . . (73) ***Dilophotriche tristachyoides***
9b. Culm nodes not dark color, annuals . . . . . (18) ***Aristida diminuta***
10a. Leaf blades convolute . . . . . (168) ***Sporobolus pectinellus***
10b. Leaf blades flat 11
11a. Leaf blade margins tuberculate . . . . . (167) ***Sporobolus microprotus***
11b. Leaf blade margins not tuberculate 12
12a. Leaf sheath margins glabrous . . . . . (101) ***Eriochloa fatmensis***
12b. Leaf sheath margins hairy 13
13a. Leaf sheath surfaces glabrous . . . . . (189) ***Urochloa jubata***
13b. Leaf sheath surfaces hairy 14
14a. Culm nodes dark color . . . . . (38) ***Cenchrus violaceus***
14b. Culm nodes not dark color 15
15a. Leaf blade bases cordate . . . . . (197) ***Urochloa xantholeuca***
15b. Leaf blade bases not cordate 16
16a. Leaf blades lanceolate, bases broadly rounded . . . . . (193) ***Urochloa ramosa***
16b. Leaf blades linear, bases simple . . . . . (171) ***Sporobolus stolzii***

GROUP 18. LIGULES ECILIATE MEMBRANE

1a. Plants monoecious, culm internodes solid . . . . . (199) ***Zea mays***
1b. Plants not monoecious, culm internodes not solid 2
2a. Culm internodes elliptical in section . . . . . (80) ***Eleusine indica***
2b. Culm internodes terete in section 3
3a. Basal innovations present 4
3b. Basal innovations absent 5
4a. Basal innovations flabellate . . . . . (149) ***Schizachyrium gresicola***
4b. Basal innovations extravaginal . . . . . (51) ***Cymbopogon caesius***

5a. Leaf bases broadly rounded . . . . . (67) ***Digitaria gayana***
5b. Leaf bases simple 6
6a. Collars white color . . . . . (61) ***Digitaria ciliaris***
6b. Collars not white color 7
7a. Leaf blades spreading, surfaces glabrous . . . . . (182) ***Trichoneura mollis***
7b. Leaf blades ascending, surfaces not glabrous 8
8a. Leaf blade margins glabrous . . . . . (46) ***Coelachyrum brevifolium***
8b. Leaf blade margins scabrous 9
9a. Ligules apex lacerate . . . . . (83) ***Elytrophorus spicatus***
9b. Ligules apex erose or acute 10
10a. Leaf blade surfaces hairy . . . . . (150) ***Schizachyrium nodulosum***
10b. Leaf blade surfaces glabrous 11
11a. Culms slender, ligules apex acute . . . . . (71) ***Digitaria ternata***
11b. Culms not slender, ligules apex erose . . . . . (65) ***Digitaria exilis***

GROUP 19. LIGULES CILIATE OR CILIOLATE MEMBRANE

1a. Butt sheaths woolly or pubescent . . . . . (116) ***Loudetia simplex***
1b. Butt sheaths not woolly or pubescent 2
2a. Culms robust 3
2b. Culms not robust 4
3a. Leaf margins glabrous, perennials . . . . . (132) ***Panicum fluviicola***
3b. Leaf margins hairy, annuals . . . . . (131) ***Panicum callosum***
4a. Culm internodes striate . . . . . (160) ***Setaria verticillata***
4b. Culm internodes not striate 5
5a. Collars white color 6
5b. Collars not white color 7
6a. Leaf blade margins glabrous . . . . . (100) ***Eragrostis turgida***
6b. Leaf blade margins scabrous . . . . . (40) ***Chloris pilosa***
7a. Culms soft or spongy . . . . . (145) ***Sacciolepis chevalieri***
7b. Culms not soft or spongy 8
8a. Culm internodes pubescent 9
8b. Culm internodes glabrous 10
9a. Leaf sheath surfaces scabrous . . . . . (38) ***Cenchrus violaceus***
9b. Leaf sheath surfaces hairy . . . . . (20) ***Aristida hordeacea***
10a. Butt sheaths persisting and investing base of culms, compacted dead sheaths 11
10b. Butt sheaths not investing base of culms, without compacted dead sheaths 12
11a. Basal innovations flabellate . . . . . (9) ***Andropogon festuciformis***
11b. Basal innovations subterete . . . . . (180) ***Trichanthecium brazzavillense***
12a. Leaf blades conduplicate . . . . . (143) ***Rottboellia afraurita***
12b. Leaf blades not conduplicate 13
13a. Culms disarticulate at the nodes . . . . . (16) ***Aristida adscensionis***
13b. Culms not disarticulate at the nodes 14
14a. Leaf blades spreading . . . . . (41) ***Chloris prieurii***
14b. Leaf blades ascending 15
15a. Leaf sheath ribbed 16
15b. Leaf sheath not ribbed 17
16a. Leaf blades reflexed or drooping . . . . . (97) ***Eragrostis squamata***
16b. Leaf blades straight . . . . . (158) ***Setaria pumila***
17a. Leaf blades involute . . . . . (95) ***Eragrostis plurigluma***
17b. Leaf blades not involute 18
18a. Leaf blades linear-lanceolate . . . . . (133) ***Panicum laetum***
18b. Leaf blades linear 19

19a. Culms with prop roots 20
19b. Culms without prop roots 21
20a. Culms erect . . . . . (35) ***Cenchrus pedicellatus***
20b. Culms geniculately ascending . . . . . (162) ***Sorghum arundinaceum***
21a. Culm nodes dark color, butt sheaths with white hairs . . . . . (152) ***Schizachyrium rupestre***
21b. Culm nodes not dark color, butt sheaths without white hairs 22
22a. Leaf sheath surfaces hairy 23
22b. Leaf sheath surfaces not hairy 24
23a. Leaf sheath surfaces hairy all their length . . . . . (34) ***Cenchrus hordeoides***
23b. Leaf sheath surfaces hairy ⅓ their length . . . . . (93) ***Eragrostis lingulata***
24a. Leaf blade margins scabrous 25
24b. Leaf blade margins glabrous 26
25a. Culms erect, unbranched . . . . . (5) ***Anadelphia leptocoma***
25b. Culms geniculately ascending, ample branching . . . . . (36) ***Cenchrus polystachios* subsp. *atrichus***
26a. Leaf blade margins hairy . . . . . (17) ***Aristida cumingiana* var. *uniseta***
26b. Leaf blade margins glabrous . . . . . (177) ***Themeda triandra***

Descriptions

1. *Acrachne racemosa* (B. Heyne ex Roem. & Schult.) Ohwi

FIGURE 10

Acrachne racemosa (B. Heyne ex Roem. & Schult.) Ohwi, Bull. Tokyo Sci. Mus. 18: 1. 1947.
Common name: goosegrass.

Caespitose or solitary, annuals. Culms up to 75 cm tall, weak, slender, geniculately ascending or decumbent; internodes glabrous; nodes dark, pubescent or bearded, occasionally rooting below; butt sheaths papery, glabrous, and sparsely hairy. Leaves mostly cauline; sheaths glabrous; collars glabrous or bearded; ligules 0.8–1.5 mm long, a ciliolate membrane; blades 13–27 cm long, 0.3–1.2 cm wide, flat, glabrous or sparsely hairy with slightly scabrid margins, cartilaginous, bases broadly rounded, apex attenuate to filiform. Inflorescences composed of racemes, digitate or subdigitately arranged, spikelets appressed, biseriate; racemes 1.5–10 cm long. Spikelets 5.5–13 mm long, 2.5–3 mm wide, 8–16-flowered, laterally compressed, breaking up at maturity; lemma mucronate, the mucro 0.3–0.9 mm long, apical, straight, clearly exserted from spikelets, without a column. Distribution: Africa, temperate Asia, tropical Asia, and Australasia.

2. *Acroceras amplectens* Stapf

FIGURE 11

Acroceras amplectens Stapf, Fl. Trop. Afr. 9: 625. 1920.
Common names: *diivoonu*, *niari*; Jaieo millet.

Annual herbs with well-developed roots. Culms 30–100 cm long, weak, decumbent; internodes glabrous; rooting from lower nodes. Leaves cauline; sheaths open, hairy; ligules 0.5 mm long, eciliate membrane, apex entire or absent; blades 4–20 cm long, 3–10 mm wide, linear, flat, glabrous, without cross veins or



FIGURE 10. *Acrachne racemosa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C modified from Ibrahim and Kabuye (1988), *N. El Hadidi & A. Khattab s.n.* (CAI); B drawn from *L. Snook 9899* (US-3427880), *G. Sockoon 1408* (US-2461138).

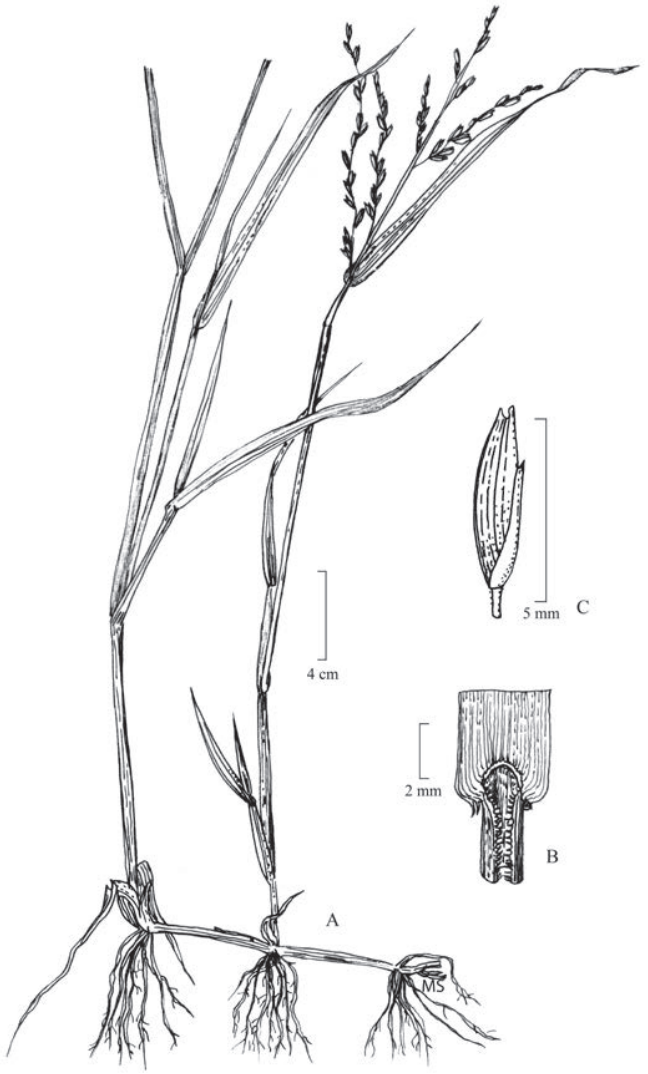


FIGURE 11. *Acroceras amplectens.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *G. A. K Adesi 435* (US-2209003).

with obscure cross veins, bases cordate, or amplexicaul, margins slightly scabrid, apex acuminate. Inflorescences composed of racemes. Racemes 3–12 cm long, 4–6 in number, borne along central axis, distant, unilateral. Spikelets 4.5–6 mm long, falling entire, lax, in pairs, awnless. Distribution: tropical Africa.

3. *Alloteropsis paniculata* (Benth.) Stapf

FIGURE 12

Alloteropsis paniculata (Benth.) Stapf, Fl. Trop. Afr. 9(3): 486. 1919 [24 Jan 1919].
Common names: *hori, subu.*

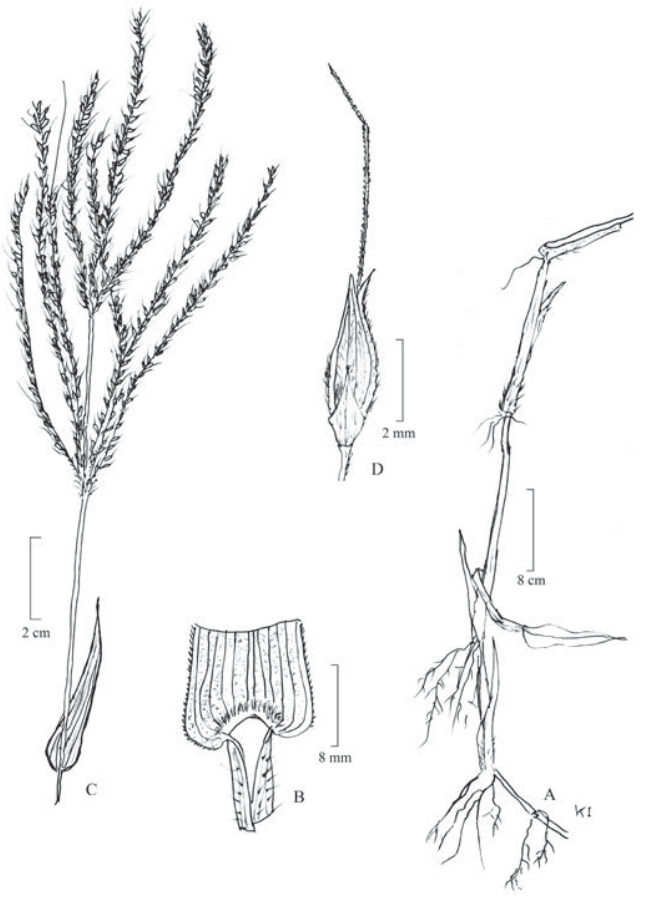


FIGURE 12. *Alloteropsis paniculata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from *R. Germain 591* (US-2823510); B drawn from Poilecot (1995).

Annuals. Culms up to 100 cm high, solitary or in scanty fascicles, erect or geniculately ascending; internodes glabrous, finely striate; often rooting from the lower nodes; simple or very sparingly branched below. Leaves cauline; sheaths loose, much longer than blades, glabrous and smooth or shortly hispidulous; ligules reduced to ciliate rim; blades 5–15 cm long, 0.4–1 cm wide, midrib whitish indistinct, lanceolate, scabrous with cartilaginous margins, bases cordate or subcordate, apex acuminate. Inflorescences 9–20 cm long, a fastigiate panicle of whorled or upward scattered racemes. Spikelets 3.5–4.5 mm long, clustered in pairs at each node, elliptic, dorsally compressed, falling entire; principal lemma awns 2.5–7 mm long, apical, straight. Distribution: tropical Africa and western Indian Ocean.

4. *Anadelphia afzeliana* (Rendle) Stapf

FIGURE 13

Anadelphia afzeliana (Rendle) Stapf, Fl. Trop. Afr. 9: 397. 1919.
Common name: thatchgrass.

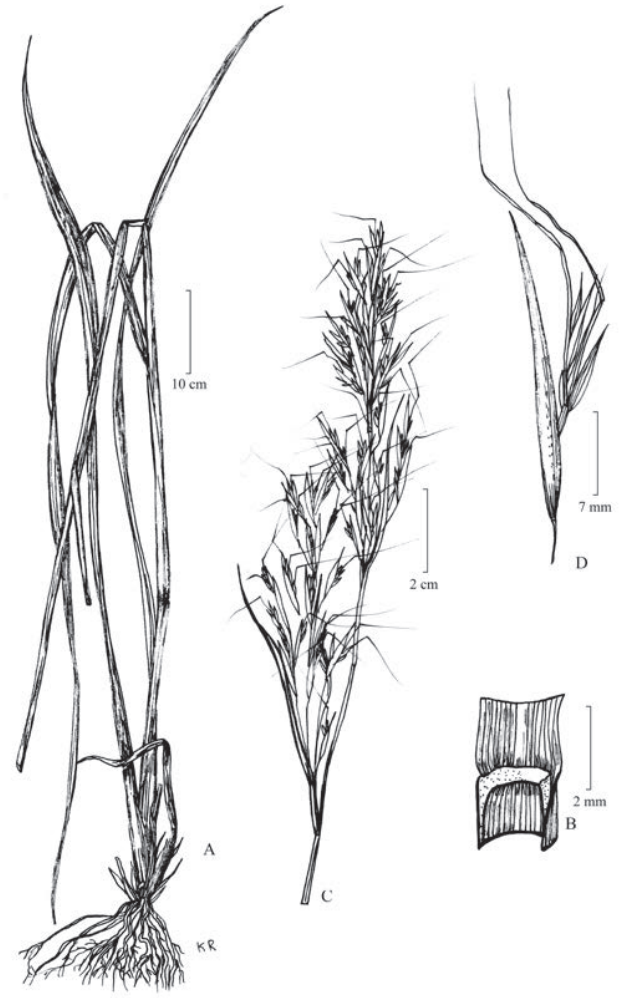


FIGURE 13. *Anadelphia afzeliana.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *G. A. Mensah 625* (US-2209107).

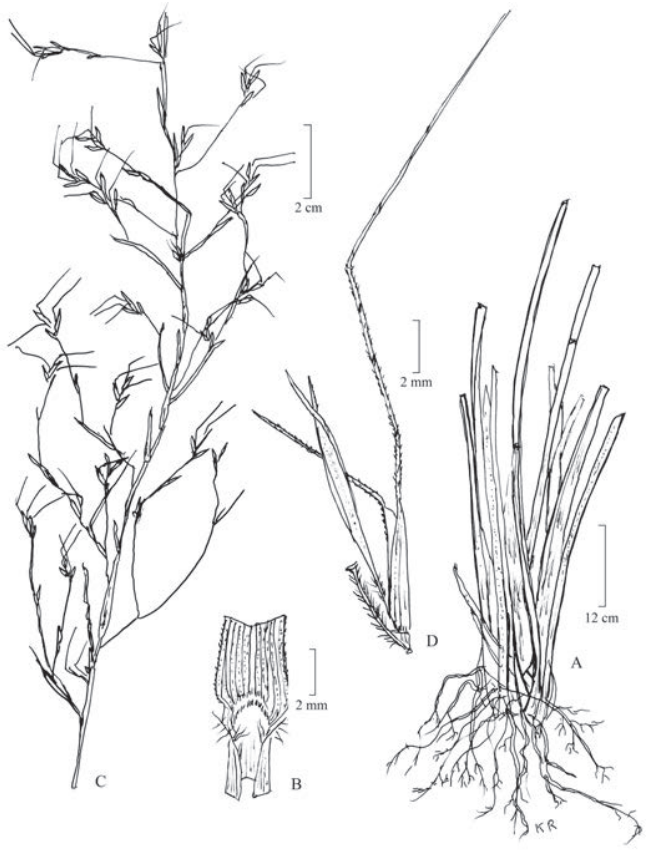


FIGURE 14. *Anadelphia leptocoma.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *J. T. Baldwin Jr. 5932* (US-2673014).

Caespitose perennials. Culms 100–200 cm high, erect; internodes hirsute or bearded. Leaves cauline; sheaths glabrous, softly hairy to villous with the exception of the glabrous bases; ligules 1 mm long, ciliolate membrane; blades 10–25 cm long, 0.2–0.4 cm wide, midribs fine white, linear, flat, softly hirsute to villous on both sides, margins slightly scabrid, bases simple and apex long–tapering to fine point. Racemes 2–3.5 cm long, terminal and axillary, narrowly lanceolate, linear; subtended by spatheoles, scarious, sparingly hairy. Spikelets in pairs, fertile spikelets 5–8 mm long, sterile spikelets 6–9 mm long; principal lemma awns 25–40 mm long overall, from a sinus, geniculate, with twisted column. Distribution: tropical Africa.

5. *Anadelphia leptocoma* (Trin.) Pilg.

FIGURE 14

Anadelphia leptocoma (Trin.) Pilg., Bot. Jahrb. Syst. 54: 284. 1917.

Common name: thatchgrass.

Caespitose perennials. Culms 100–150 cm high, glabrous, erect; nodes glabrous; branching from the lower culms. Leaves cauline; sheaths glabrous, basal ones strongly compressed; ligules reduced to a ciliolate rim; blades 15–30 cm long, 0.2–0.6 cm wide, linear, flat, rigid, glabrous or hairy on the basal ⅓, inconspicuous midribs, slightly recessed above and slightly protruding below, margins scabrous, bases rounded, apex acute. Inflorescence a spatheate panicle. Spikelets 5–7 mm long, in pairs; lemma awns geniculate, arising from the sinus with twisted column. Distribution: Africa.

6. *Andropogon africanus* Franch.

FIGURE 15

Andropogon africanus Franch., Bull. Soc. Hist. Nat. Autun. 8: 325. 1895.

Caespitose perennials. Culms 50–250 cm high, erect, glabrous; nodes glabrous; branching arising from the lower culms. Leaves basal and cauline; sheaths firm, glabrous, the lower keeled upward; ligules ciliolate membrane; blades 10–40 cm long; 2–7 mm wide very short, linear, flat, or conduplicate, glabrous with distinct recessed protruding midribs, margins glabrous, bases simple, apex abruptly acute canoe-shaped point. Inflorescences composed of racemes; terminal and axillary; subtended by a spatheole; spatheoles 7–10 cm long, linear. Spikelets 4–7 mm dorsally compressed in pairs; principal lemma awns geniculate, arising from the sinus with twisted column. Distribution: tropical Africa.

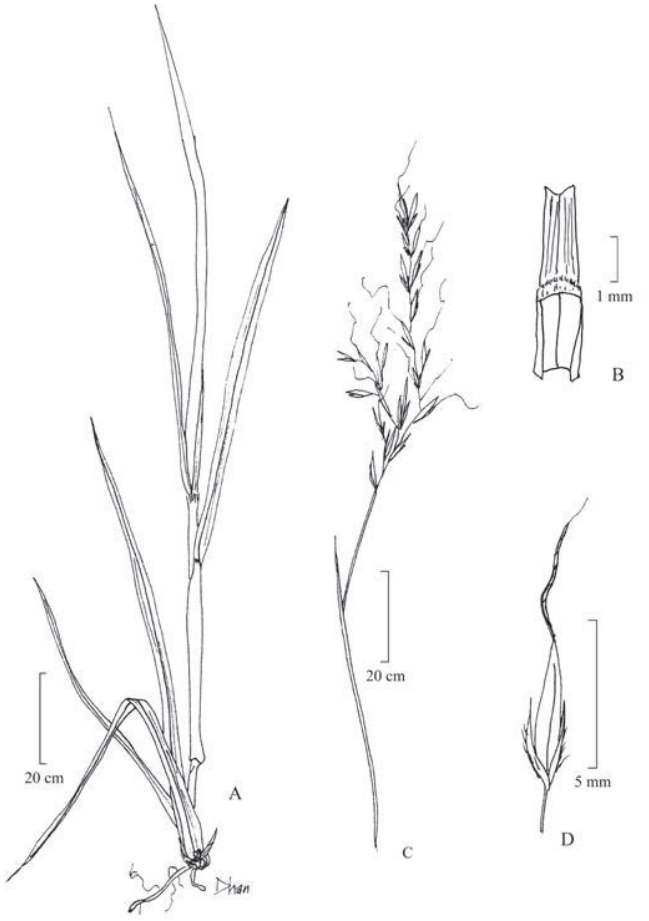


FIGURE 15. *Andropogon africanus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *M.-R. & T. 9418* (US-2892212).

7. *Andropogon canaliculatus* Schumach.

FIGURE 16

Andropogon canaliculatus Schumach., Beskr. Guin. Pl. 52. 1827.

Caespitose perennials. Culms 25–200 cm high, erect, glabrous, branching upper part; nodes glabrous; branches ample at the base. Leaves basal and cauline; sheaths open; oral hairs ciliate; auricles erect or absent; ligules up to 2 mm long, an eciliate membrane; blades 10–40 cm long, 1–5 mm, wide, linear, flat, or partially folded, the basal ones are folded and compressed, narrow, glabrous, inconspicuous whitish hyaline midrib slightly recessed above and protruding below on the lower ⅔, simple bases, margins slightly scabrid, acute apex. Inflorescences of paired racemes 3–9 cm long, occasionally terminal, spatheate. Spikelets 3.5–6 mm long, in pairs, dorsally compressed; principal lemma awns geniculate, arising from the sinus with twisted column. Distribution: tropical Africa.

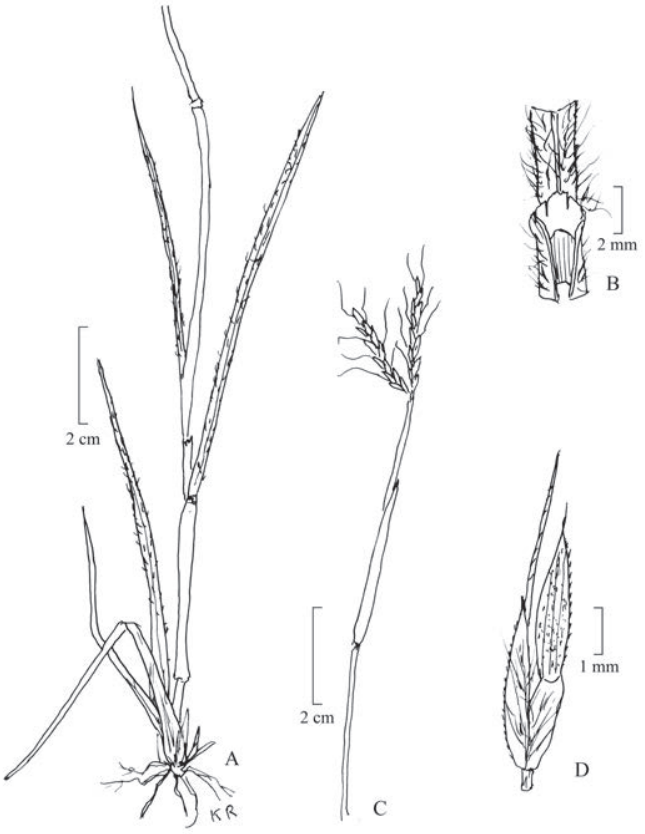


FIGURE 16. *Andropogon canaliculatus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Rose-Innes, GH 30570* (US-2433219).

8. *Andropogon chevalieri* Reznik

FIGURE 17

Andropogon chevalieri Reznik, Rev. Bot. Appl. Agric. Trop.13: 870. 1933.

Caespitose annuals; branching sparse. Culms 200–250 cm high, erect, internodes, glabrous; nodes glabrous. Leaves mostly cauline; sheaths glabrous; auricles erect, 3–9 mm long; ligules eciliate membrane, 2–10 mm long; blades linear, flat or involute, glabrous and smooth, simple bases, apex acute or filiform. Inflorescences of paired racemes, 4–6 cm long, occasionally terminal, subtended by a spatheole. Spikelets in pairs, sterile spikelets 5–10 mm long, fertile spikelets 5.5–10 mm long, dorsally compressed; principal lemma awns 18–25 mm long overall, from a sinus, geniculate, with twisted glabrous column. Distribution: tropical West Africa.

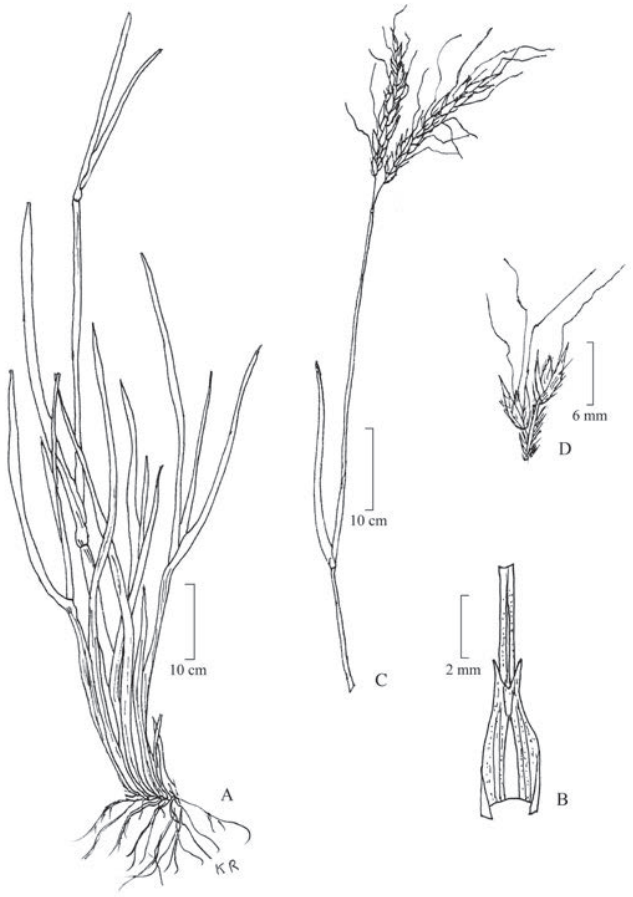


FIGURE 17. *Andropogon chevalieri.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

9. *Andropogon festuciformis* Rendle

FIGURE 18

Andropogon festuciformis Rendle, Cat. Afr. Pl. 2: 145. 1899.

Caespitose perennials. Culms up to 140 cm high, erect, reddish throughout; branches ample, arising from upper culm; butt sheaths persistent and investing base of culm, with compacted dead sheaths. Leaves cauline; sheaths glabrous, laterally compressed and keeled, basal sheaths distichous; ligules ciliolate membrane, 0.5 mm long; blades 5–28 cm long, 1.8–4 mm wide, stiff, linear, flat, conduplicate, glabrous with narrow bases and acuminate apex. Inflorescences 3–4 cm long, solitary racemes in fascicles of 1–6 at regular intervals along the culm. Sterile spikelets



FIGURE 18. *Andropogon festuciformis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Jacques-Felix, 7430* (K).

3.5–4.5 mm long, lanceolate, dorsally compressed, fertile spikelets 3.5–4.5 mm long, lanceolate, dorsally compressed. Distribution: widespread across tropical parts of Africa, Asia, and the Americas.

10. *Andropogon gayanus* Kunth

FIGURE 19

Andropogon gayanus Kunth, Révis. Gramin. 1: 163. 1829.
Common names: *guelori, nguon;* Rhodesian blue grass, tambuki grass.

Caespitose perennials. Culms up to 400 cm high, erect, glabrous; branches sparse, arising from the lower culms. Leaves basal and cauline; sheaths open, keeled toward the tops, glabrous, ribbed; ligules eciliate brownish membrane, less than 3 mm long; blades linear, flat, glabrous, tuberculate-ciliate margins, base attenuate tapering to midrib with or without a false petiole, acute apex. Inflorescences paired recemes subtended by a spatheole. Fertile spikelets 5–8 mm long, in pairs, oblong, dorsally compressed, sterile spikelets 5–8 mm, elliptic, dorsally compressed; principal lemma awns 10–30 mm long overall, from a sinus, geniculate, with twisted glabrous column. Distribution: throughout tropics of Old and New Worlds.

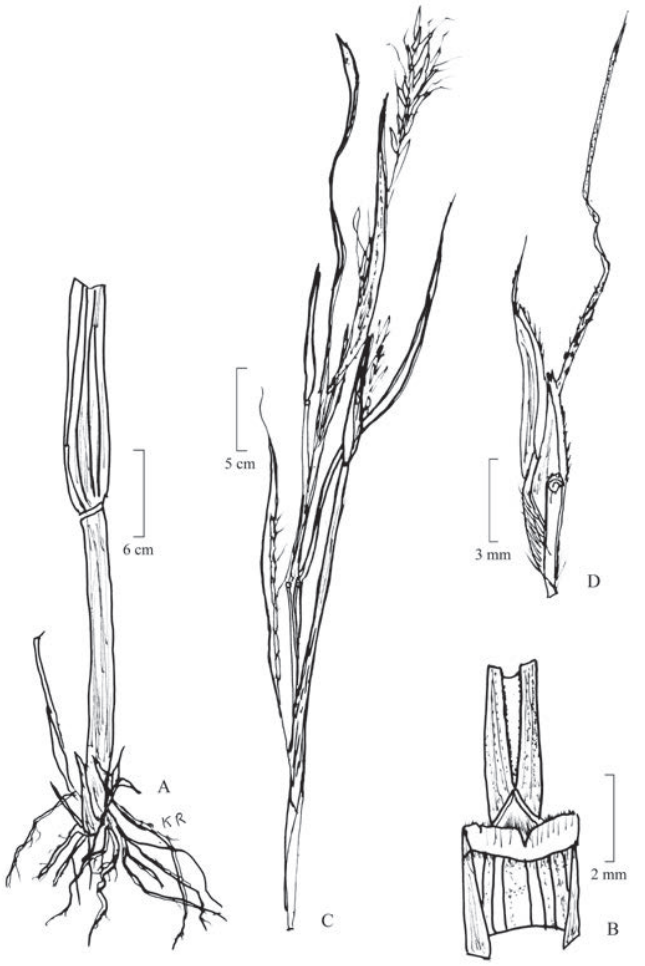


FIGURE 19. *Andropogon gayanus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *A. S. Hitchcock* (US-1446837).

11. *Andropogon ivorensis* Adjan. & Clayton

FIGURE 20

Andropogon ivorensis Adjan. & Clayton, Adansonia n.s., 3: 401. 1963.

Caespitose annuals. Culms erect; internodes glabrous. Leaves cauline; sheaths open, glabrous; ligules ciliolate membrane, less than 3 mm long; blades linear, flat, sparsely hairy with scabrous margins and attenuate apex. Inflorescences paired, racemes 9–11 cm long, hidden in sheaths. Fertile spikelets 8 mm long, lanceolate, dorsally compressed, sterile spikelets 12 mm

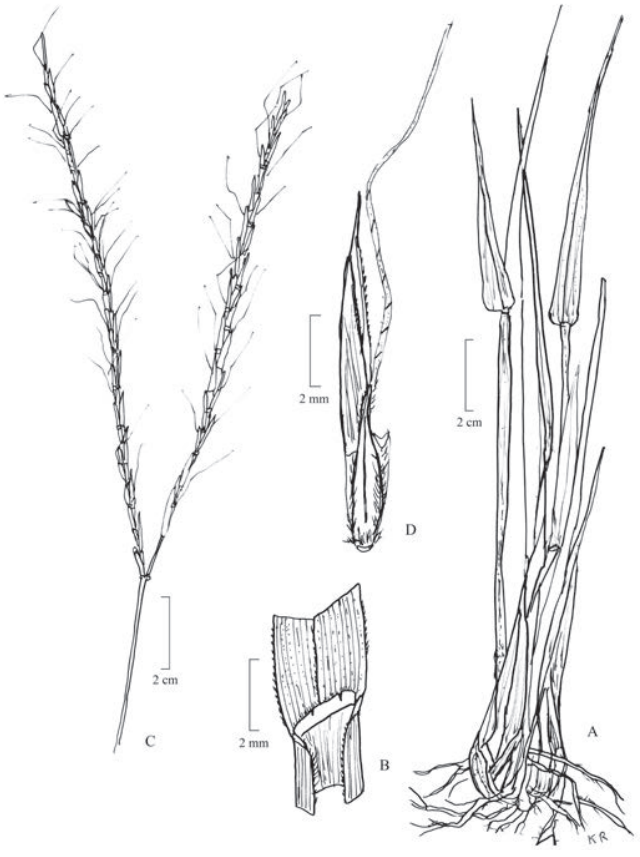


FIGURE 20. *Andropogon ivorensis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Boudet 3319* (US-3004041).

long; principal lemma awns geniculate, arising from the sinus with twisted column. Distribution: tropical West Africa.

12. *Andropogon perligulatus* Stapf

FIGURE 21

Andropogon perligulatus Stapf, Bull. Misc. Inform. Kew 1908: 410. 1908.

Common name: bushy bluestem grass.

Caespitose perennials. Culms up to 150 cm high, erect, bases with fibrous dead leaf sheaths; branches ample at the base; internodes glabrous. Leaves basal and cauline; sheaths glabrous, auricles erect; ligules (1.5–)2.5–6 mm long, eciliate membrane with truncate apex; blades linear 7.5–33 cm long, 0.1–0.32 mm wide, revolute with conspicuous keel, shortly and densely pilose, margins tuberculate-ciliate, tapering to a very fine point at the apex. Inflorescences composed of racemes. Racemes 1.5–7.5 cm long, in pairs, exserted from the spatheoles; spatheoles 8–14 cm long, linear. Fertile spikelets 5–6 mm long, sterile spikelets 4–5 mm long; principal lemma awns geniculate, arising from the sinus with twisted column. Distribution: tropical and temperate Africa.

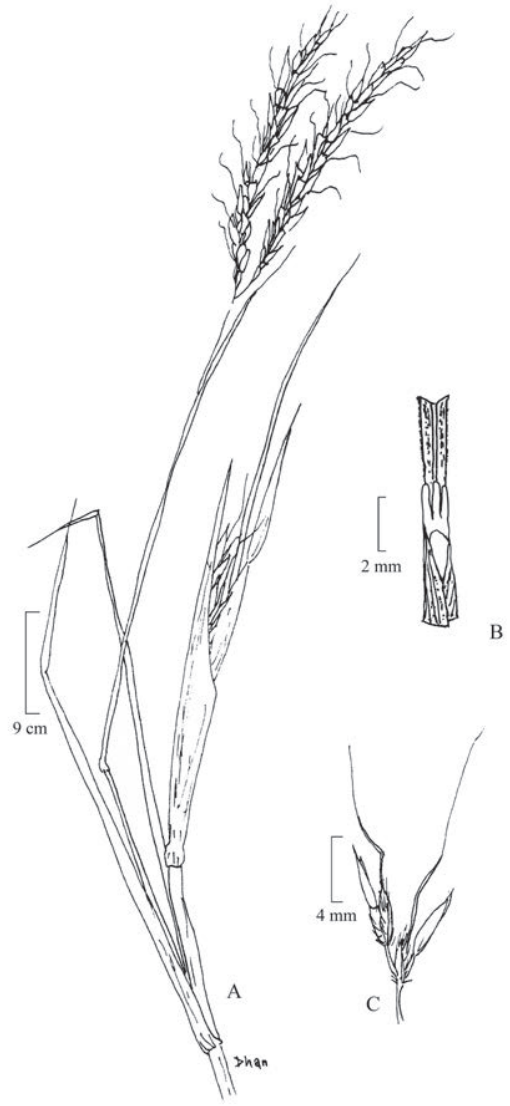


FIGURE 21. *Andropogon perligulatus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

13. *Andropogon pseudapricus* Stapf

FIGURE 22

Andropogon pseudapricus Stapf, Fl. Trop. Afr. 9: 242. 1918.

Caespitose annuals. Culms up to 150 cm high, stout, geniculately ascending, sometimes with prop roots, internodes glabrous; branched upper nodes. Leaves basal and cauline; sheaths

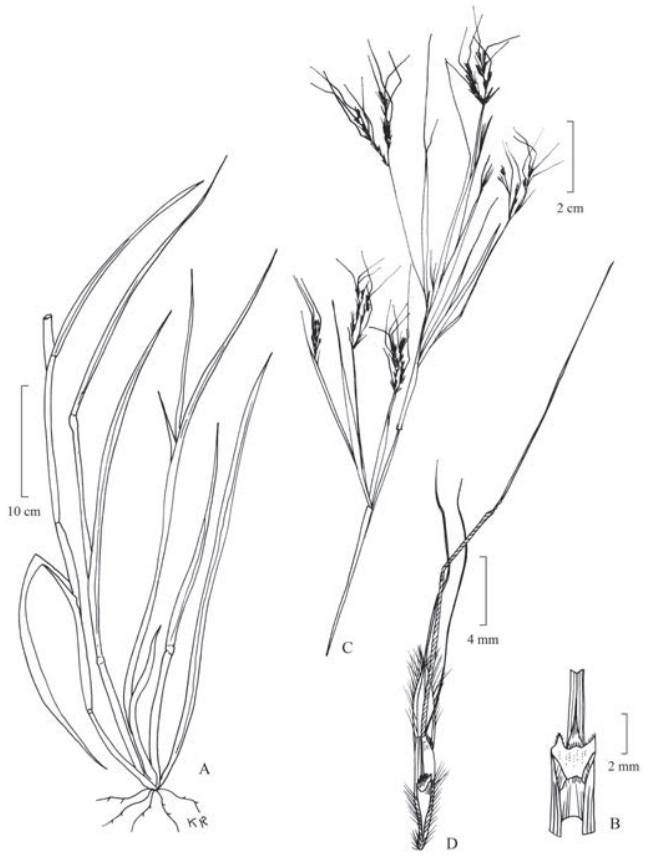


FIGURE 22. *Andropogon pseudapricus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *J. C. Adam 13836* (US-2936681), *Dalziel 287* (US-2433410).

glabrous or rarely loosely pilose; ligules up to 2 mm long, an eciliate membrane, pinkish color and fused with auricles; blades 8–40 cm long, 0.1–0.5 cm wide, linear, flat, glabrous with a pale hyaline midrib and slightly scabrid margins with bases narrower than the sheaths apex. Inflorescences of paired racemes 2–4 cm long, linear to narrowly lanceolate; spatheoles 5 cm long. Fertile spikelets 5–6 mm long, laterally compressed, sterile spikelets 4–5 mm long, elliptic, dorsally compressed; principal lemma awns 30–50 mm long, geniculate, from the sinus with twisted column. Distribution: West Africa, from Senegal to Chad and Cameron; probably introduced in Mexico and Brazil.

14. *Andropogon tectorum* Schum. & Thonn.

FIGURE 23

Andropogon tectorum Schum. & Thonn., Beskr. Guin. Pl. 49. 1827.
Common names: *wara*; horse grass.

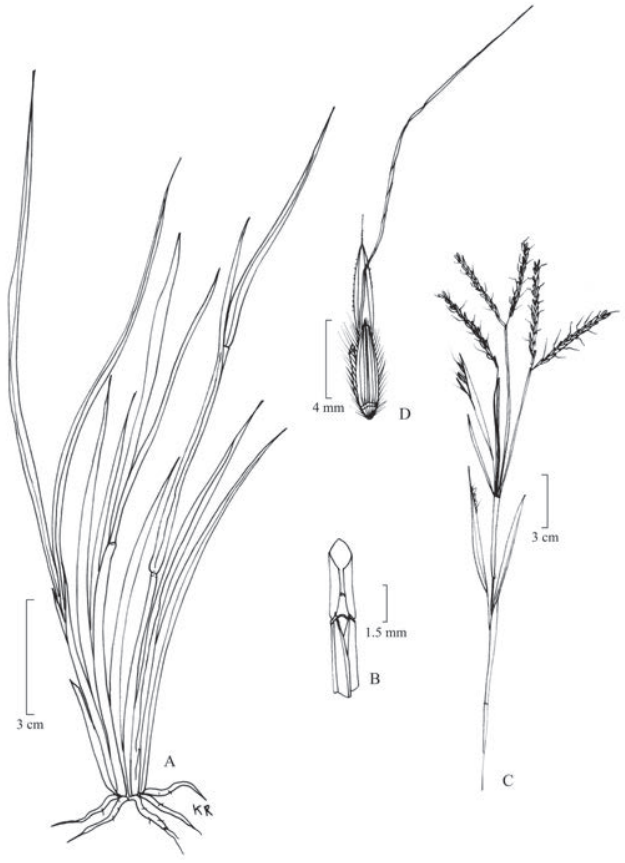


FIGURE 23. *Andropogon tectorum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *J. P. M. Brenan 8645* (US-2012572).

Caespitose perennials. Culms 20–50 cm high; internodes smooth, glabrous, branched upward with or without prop roots. Leaves basal and cauline; sheaths glabrous; ligules 1–2 mm long, an eciliate membrane or ciliolate membrane; blades 30–45 cm long, 2–3 cm wide, lanceolate, glabrous or puberulous at the tips, markedly finely nerved with a conspicuous white midrib protruding prominently below with margins scabrous or spinulously ciliate bases attenuated narrowing toward midrib with a false petiole, acute apex. Inflorescences composed of paired racemes, 3–4 cm long. Fertile spikelets 4–5 mm long, oblong, dorsally compressed, sterile spikelets 4–5 mm long, oblong, dorsally compressed; principal lemma awns 15–20 mm long overall, from sinus, geniculate, with twisted column. Distribution: tropical Africa.

15. *Anthephora pubescens* Nees

FIGURE 24

Anthephora pubescens Nees, Fl. Afr. Austral. Ill. 74. 1841.
Common names: bottle brush grass, cat's tail grass, wool grass.

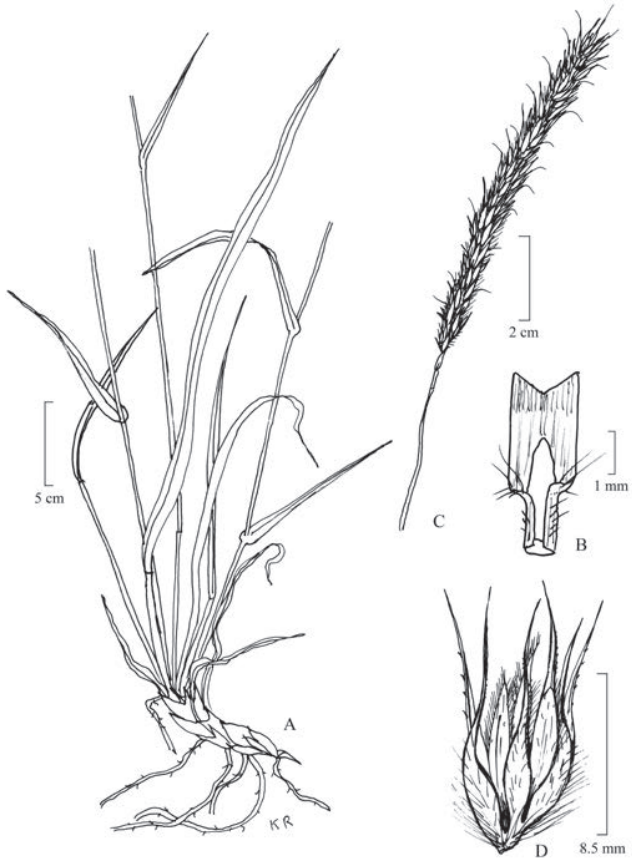


FIGURE 24. *Anthephora pubescens.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *A. Pappi 426* (US-2077137).

Caespitose perennials; rhizomes short, wiry. Culms up to 200 cm long, unbrached, erect or geniculately ascending; internodes glabrous; butt sheaths persistent and investing base of culms. Leaves mostly basal; sheaths glabrous, sometimes scantily bearded at the mouth, or more or less pubescent to villous all over; upper sheaths hairy or glabrous; auricles erect or absent; ligules 2–8 mm long, eciliate membrane, obtuse; blades 10–40 cm long and 0.2–0.6 cm wide, linear, flaccid, flat, margins thickened, crinkled, apex attenuate. Inflorescences 5–15 cm long, 0.5–1 cm wide, straw-colored cylindrical spike, comprising clusters of 3–11 spikelets surrounded by an involucre of stiff, narrowly elliptic bracts on reduced axis along a main axis. Spikelets 6–11 mm long, lanceolate to narrowly ovate, awnless. Distribution: tropical Africa.

16. *Aristida adscensionis* L.

FIGURE 25

Aristida adscensionis L., Sp. Pl. 1: 82. 1753.
Common names: *allomoze*, *dugun bee*; annual bristle grass, broomstick grass.

Caespitose annuals. Culms 15–50 cm tall, erect, weak, geniculate; nodes dark; internodes glabrous; sometimes rooting at lower nodes; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, margins membranous; ligules 0.5–1 mm long, ciliolate membranes; blades 5–15 cm long, 1–2.5 mm wide, linear, conduplicate, stiff, sparsely hairy, margins smooth, apex acuminate. Panicles 4–14 cm long, 0.5–3 cm wide, erect, terminal and axillary, rachis fragile at the nodes, ciliate on margins. Spikelets 6–12 mm long, lanceolate, subterete; lemmas 3–awned, the awns 5–25 mm long. Distribution: tropics and subtropics.

17. *Aristida cumingiana* var. *uniseta* Stent & J. M. Rattray

FIGURE 26

Aristida cumingiana var. *uniseta* Stent and J. M. Rattray, Proc. and Trans. Rhodesia Sci. Assoc. 32: 48. 1933.

Solitary or densely caespitose, annuals. Culms 5–10(–25) cm high, erect; branching ample from lower culms; internodes glabrous; nodes glabrous. Leaves mostly cauline; sheaths smooth or minutely pubescent, striate, keeled; collars glabrous or minutely pubescent; ligules short-ciliate membrane; blades up to 6 cm long, 0.1 cm wide, linear, involute, scabrous, bases simple with attenuate apex. Inflorescences panicle 3–8 cm, lax, or effuse, somewhat contracted. Spikelets 2–2.5 mm long, dark purple or greenish tinged with purple narrowly lanceolate, awns 3, unequal, delicate, scabrid, the central awn 4.5–6 mm long, slightly recurved, the lateral awns 2.5–4 mm long, suberect. Distribution: Africa.

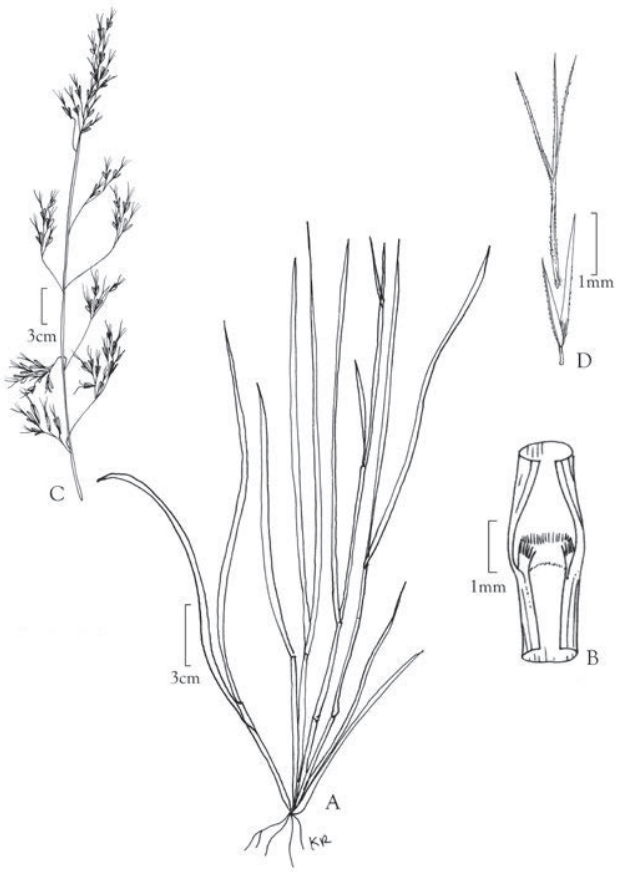


FIGURE 25. *Aristida adscensionis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm, M. Kassas, F. Shalaby, M. Samy, M. Zahran* (CAI); B–D drawn from *G. A. Mensah 476* (US-2209026).

18. *Aristida diminuta* (Mez) C. E. Hubb.

FIGURE 27

Aristida diminuta (Mez) C. E. Hubb., Kew Bull. 4: 480. 1949.

Slender tufted annuals. Culms 15–30 cm high, erect; simple or branched at the bases, glabrous; internodes smooth. Leaves mostly cauline; sheaths glabrous, smooth or minutely pubescent, striate, keeled; collars glabrous or minutely pubescent; ligules a short ciliate rim; blades 2–7(–10) cm long, 0.1 cm wide, involute, scabrous and with long scattered hairs above, glabrous, smooth beneath, apex attenuate. Panicles 4–10 cm long, open, elliptic, loose, or effuse; panicle branches capillary. Spikelets 2.5–3 mm long, solitary, lanceolate, subterete; principal lemma awns 7–10 mm long, curved, delicate, scabrous, the lateral awns absent. Distribution: tropical and temperate Africa.

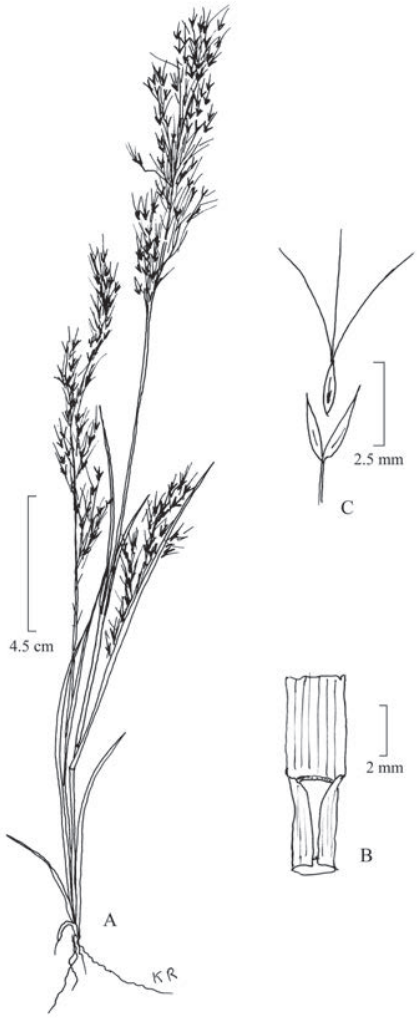


FIGURE 26. *Aristida cumingiana* var. *uniseta.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *Faden et al. 96/98* (US-3348788).

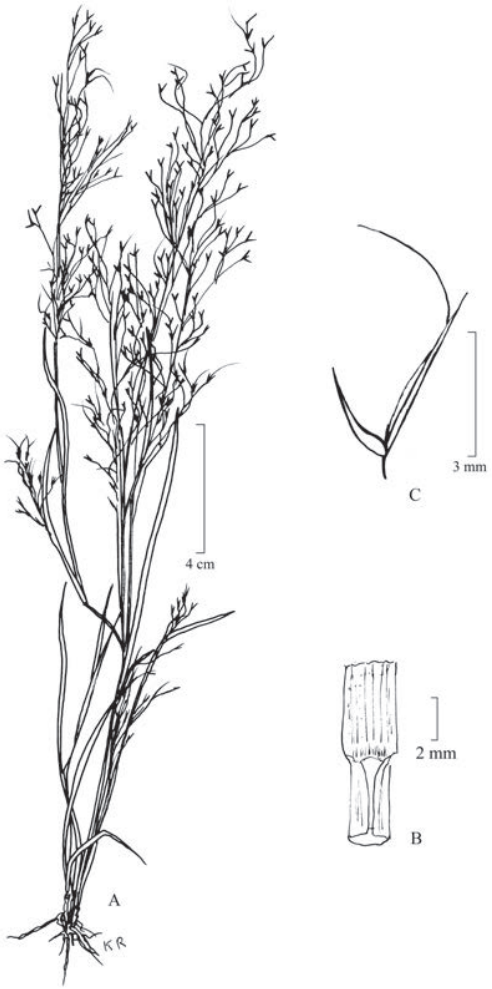


FIGURE 27. *Aristida diminuta.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *E. A. Robinson 5354* (US-2433380).

19. *Aristida funiculata* Trin. & Rupr.

FIGURE 28

Aristida funiculata Trin. and Rupr., Sp. Gram. Stipac. 159. 1842. Common names: *holu, kasso*.

Caespitose annuals. Culms 15–25 cm tall, erect, week, wiry, geniculate; internodes glabrous; butt sheaths glabrous, forming bulbs. Leaves mostly basal; sheaths open, glabrous, margins smooth; ligules 0.5–1 mm long, fringe of hairs; blades 5–20 cm long, 1–3 mm wide, linear, convolute or folded, stiff, appressed, glabrous, margins smooth, bases simple, apex acuminate. Panicles 5–10 cm long, contracted, scarcely exerted from the uppermost sheath, terminal and axillary, erect. Spikelets 20–30 mm long, lanceolate, subterete; lemmas 3-awned, the awns 35–45 mm long, the column 2–4.5 cm long, twisted. Distribution: tropical Africa to India.

20. *Aristida hordeacea* Kunth

FIGURE 29

Aristida hordeacea Kunth, Révis. Gramin. 2: 517, t. 173. 1831. Common name: fox brush.

Solitary or caespitose annuals. Culms 10–90 cm high, slender, erect or ascending; branched from the base and lower nodes;

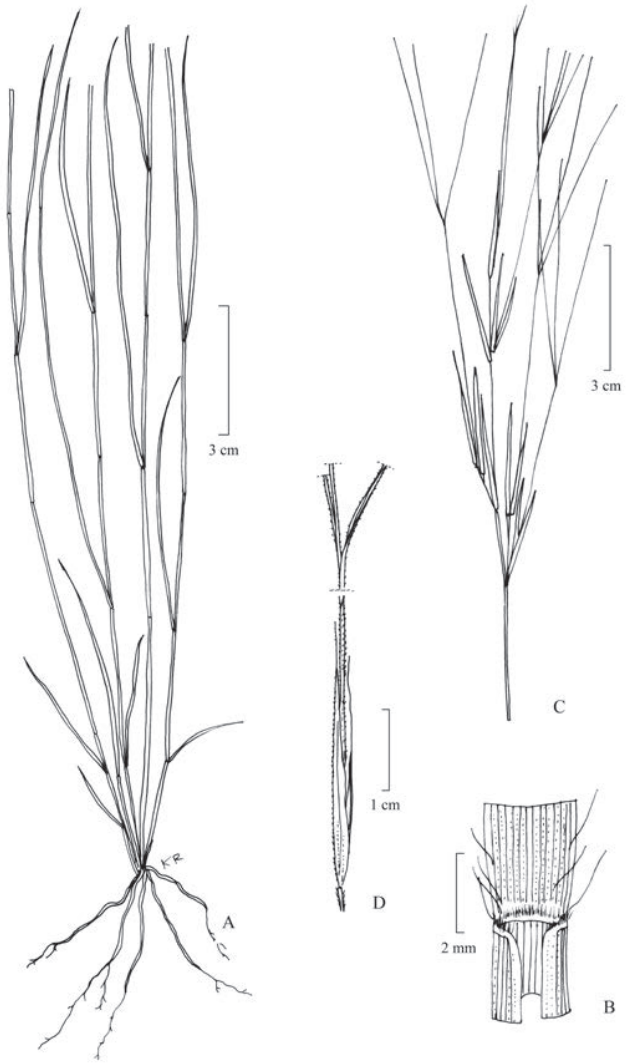


FIGURE 28. *Aristida funiculata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B–D drawn from *S. Laegaard & S. Traore 17915* (US-3595195).



FIGURE 29. *Aristida hordeacea.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A and C drawn from *P. J. Greenway 7393* (US-1913544); B drawn from Poilecot (1995).

internodes glabrous; nodes glabrous or pubescent. Leaves mostly basal; sheaths keeled, pubescent; auricles shortly barbate; collars glabrous; ligules shortly ciliate membrane; blades ca. 30 cm long, 1 cm wide, glaucous, linear, flat or folded, scabrous to hirtellous above, becoming glabrous beneath, bases simple, apex acuminate or attenuate apex. Inflorescence panicle spiciform. Spikelets 6–9 mm long, linear-lanceolate; lemmas with 3 apical awns, principal lemma awns 2.5–3.5 cm long without column spreading. Distribution: throughout tropical Africa.

21. *Aristida kunthiana* Trin. & Rupr.

FIGURE 30

Aristida kunthiana Trin. & Rupr., Sp. Gram. Stipac. 151. 1842.

Caespitose annuals. Culms 30–45 cm long, erect; internodes distally glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous; oral hairs bearded; ligules fringe of hairs; blades 5–20 cm long, 0.2–0.3 cm wide, linear, flat or convolute. Inflorescences 10–15 cm long, open panicles. Spikelets



FIGURE 30. *Aristida kunthiana.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *R. A. Farrow 81* (K).

6–12 mm long, solitary, lanceolate, subterete; principal lemma awns 3-branched, with 15–25 mm long limb, without a column, deciduous, abscissing from top of lemma. Lateral lemma awns 10–20 mm long; subequal to principal, or shorter than principal. Distribution: Mali and Senegal.

22. *Aristida mutabilis* Trin. & Rupr.

FIGURE 31

Aristida mutabilis Trin. & Rupr., Sp. Gram. Stipac. 150. 1842. Common names: *kelbi, okras*; white grass.

Caespitose annuals. Culms 10–40 cm tall, erect, weak, geniculate; nodes dark; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, margins smooth; oral hairs present; ligules 0.5–1 mm long, fringe of hairs; blades

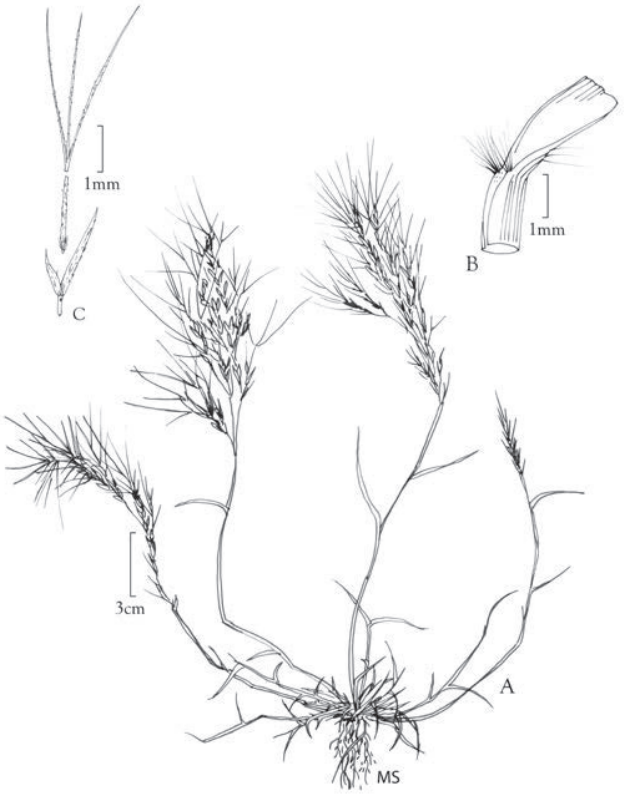


FIGURE 31. *Aristida mutabilis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *V. Täckholm 1685* (CAI), Ibrahim and Kabuye (1988); B drawn from *J. Ash 2991* (US-2837041).

2–7 cm long, 1–2 mm wide, linear, convolute, stiff, glabrous, margins smooth, bases slightly narrower than sheath apex, apex acuminate. Panicles 5–10 cm long, open, linear, erect, terminal and axillary. Spikelets 6–7 mm long, lanceolate, subterete; lemmas 3-awned, awns 10–30 mm long, the column 3–5(–6.8) mm long, twisted. Habitat: sandy soils. Distribution: tropical Africa to India.

23. *Aristida recta* Franch.

FIGURE 32

Aristida recta Franch., Bull. Soc. Hist. Nat. Autun. 8: 365. 1895.

Caespitose perennials. Persistent basal leaf sheaths breaking up into fibres and forming a dense tuft at the base of the culms; roots wiry. Culms 10–30 cm high, erect; internodes glabrous. Leaves mostly basal; sheaths glabrous, basal ones somewhat compressed; ligules a fringe of hairs; blades 5–20 cm long, 0.1 cm wide, filiform, wiry, scaberulous above, setaceous, bases simple and apex acuminate. Inflorescences 3–8 cm long, ovate-lanceolate panicle. Spikelets 5–7.5 mm long, solitary, lanceolate, subterete;

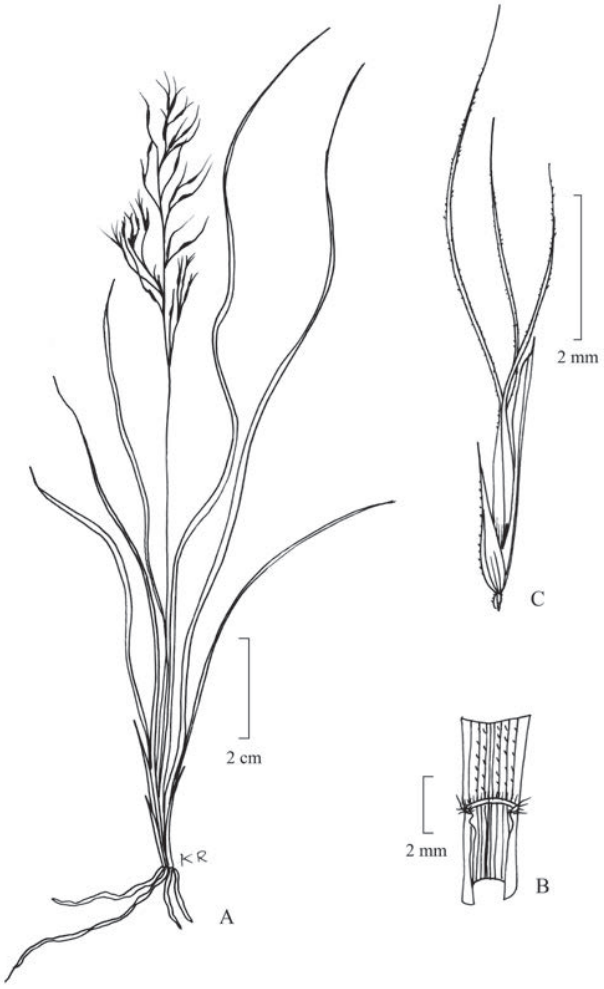


FIGURE 32. *Aristida recta.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *P. Greenway, C. G. Trapnell 5704* (US-1815404).



FIGURE 33. *Aristida rhiniochloa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *A. J. Cakes 1444* (*Ellis 541*) (US-3025943).

principal lemma awns 3-branched; with 6–8 mm long limb; without a column. Distribution: tropical and temperate Africa.

24. *Aristida rhiniochloa* Hochst.

FIGURE 33

Aristida rhiniochloa Hochst., Flora 38: 200. 1855.
Common name: large-seeded three-awn.

Caespitose annuals. Culms up to 65 cm high, erect or geniculately ascending; sparse branching from the lower and middle nodes; internodes scabrid; nodes pubescent. Leaves basal and cauline; sheaths laxly embracing the culm, keeled, scabrous; auricles long-barbate; collars bearded or glabrous; ligules ciliate membrane; blades 10–20 cm long and 0.2–0.4 cm wide, linear, flat, glaucous, scabrous, apex acuminate. Panicle up to 20 cm long, effuse or contracted. Spikelets 6–17 mm long, solitary, lanceolate, subterete; principal lemma awns 3-branched, persistent, lateral lemma awns 15–30 mm long, subequal to principal without a column. Distribution: from Mauritania in West Africa to Eritrea, Tanzania, and the Transvaal.

25. *Aristida sieberiana* Trin.

FIGURE 34

Aristida sieberiana Trin., Neue Entdeck. Pflanzenk. 2: 61. 1821.
Common names: *amadzarne, okras.*

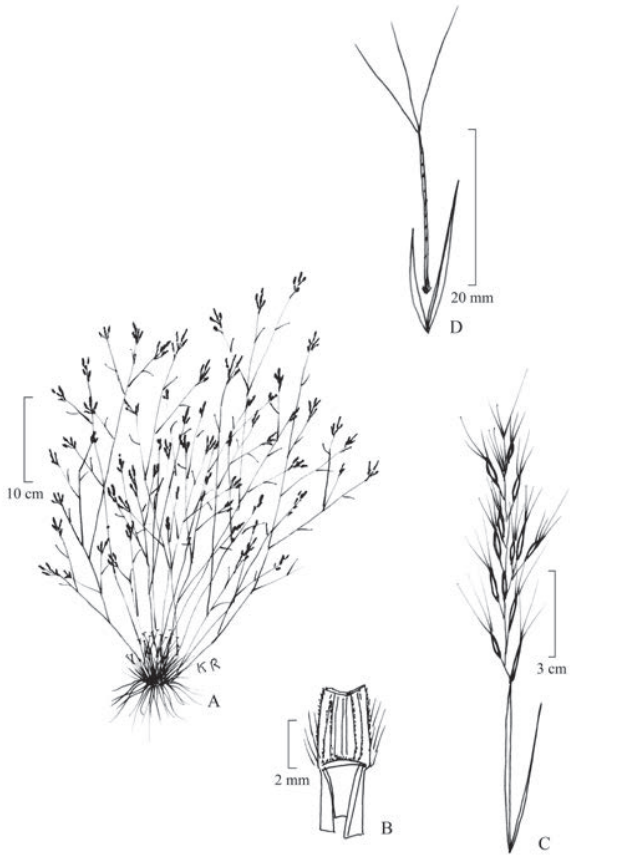


FIGURE 34. *Aristida sieberiana*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *Firubuklw 106* (US-1718599).

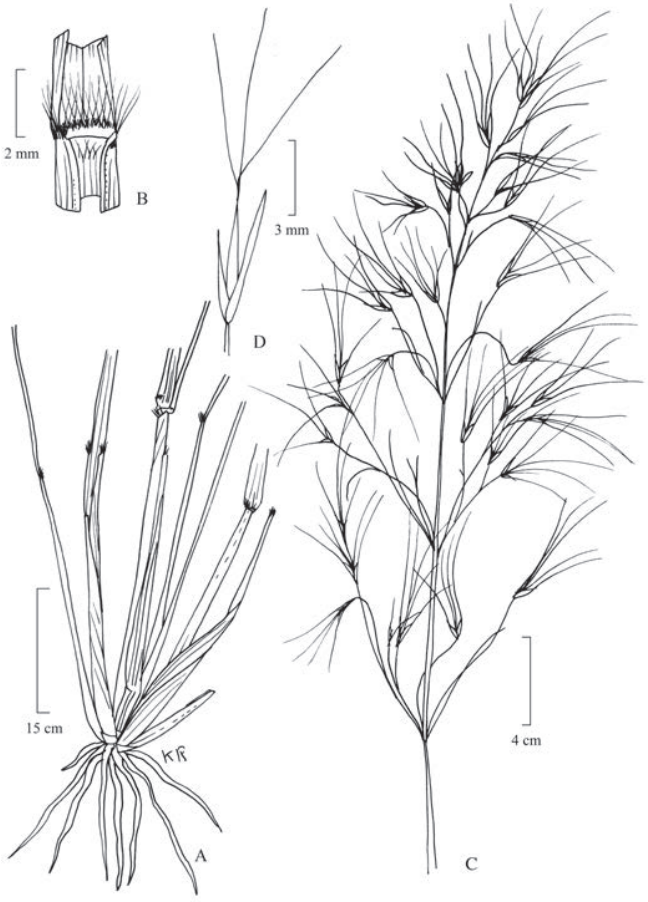


FIGURE 35. *Aristida stipoides*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *Leibeuberg 119* (US-1504693).

Caespitose perennials. Culms up to 100 cm high; erect, woody, branches ample, arising from mid culms; internodes glabrous. Leaves basal and cauline; sheaths glabrous, ribbed; ligules fringe of hairs; blades 5–30 cm long, mostly involute and narrow, glabrous, glaucous with narrow bases and acuminate apices. Panicle 8–25 cm long, loosely contracted to open. Spikelets 15–20 mm long, solitary, lanceolate, subterete; principal lemma awns 3-branched with 45–85 mm long limb, column twisted, deciduous, abscissing from top of lemma, lateral lemma awns 30–70 mm long. Distribution: Kenya; also from Senegal and Cameroon to Somalia northward to Tunisia and Palestine.

26. *Aristida stipoides* Lam.

FIGURE 35

Aristida stipoides Lam., Encycl. 1: 157. 1783.
Common names: *teloloud, telolud.*

Caespitose annuals. Culms 90–150 cm long, erect; internodes distally glabrous, solid; branches ample, rising from upper culms. Leaves basal and cauline; sheaths scabrous; oral hairs woolly; ligules fringe of hairs; blades 15–30 cm long, 0.2–0.4 cm wide, linear, flat or involute, scabrous, apex acuminate. Panicles 20–50 cm long, open, elliptic, effuse, equilateral, or nodding. Spikelets 14–20 mm long, solitary, lanceolate, subterete; principal lemma awns 3-branched with 35–60 mm long limb with twisted column, deciduous, abscissing from top of lemma, column of lemma awns 15–30 mm long; lateral lemma awns 30–50 mm long, shorter than principal. Distribution: tropical and South Africa; Asia to Australia.

27. *Arthraxon lancifolius* (Trin.) Hochst.

FIGURE 36

Arthraxon lancifolius (Trin.) Hochst., Flora 39: 188. 1856.



FIGURE 36. *Arthraxon lancifolius*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *E. Milne-Redhead & P. Taylor 10110* (US-2914457).

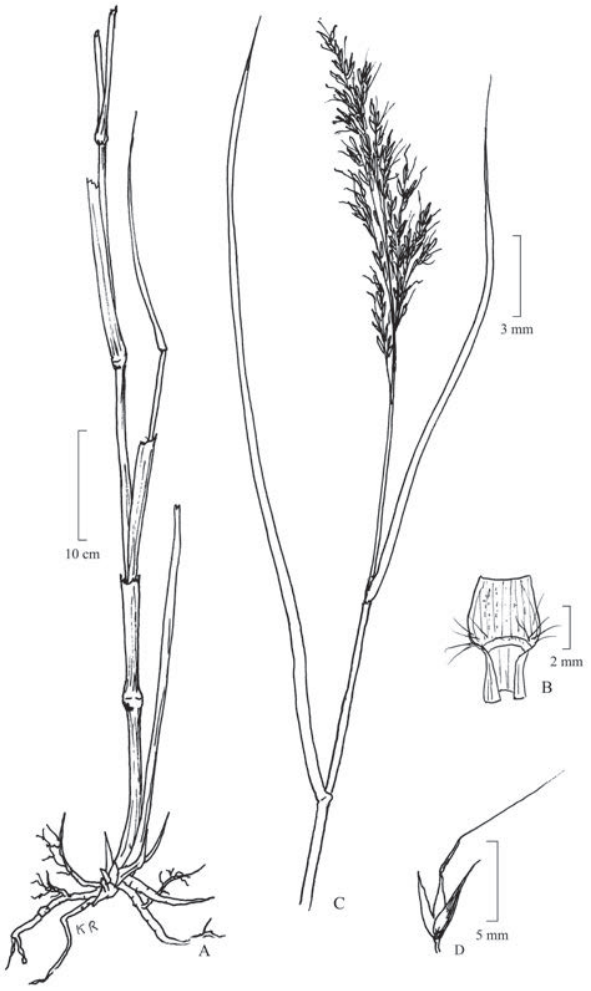


FIGURE 37. *Arundinella nepalensis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

Mat-forming annuals; stolons present. Culms 5–20 cm high, slender, procumbent or prostrate, much branched from lower culm; internodes glabrous. Leaves mostly cauline; sheaths short lax, the uppermost slightly inflated, finely hairy especially toward the base; ligules membranous, short, less than 3 mm long; blades 3 cm long, 0.6–0.8 cm wide, laceolate-ovate, flaccid, glabrous or softly hairy on both sides, barely scabrid margins, hairy, bases cordate or well rounded and apex acuminate. Inflorescences of paired racemes or up to 9, borne along central axis 1–2 cm long. Spikelets 2–3 mm long in pairs, laterally compressed; principal lemma awns 6–10 mm long, arising from near the base, very delicate, bent and twisted below the middle. Distribution: tropical and temperate Africa and Asia to India.

28. *Arundinella nepalensis* Trin.

FIGURE 37

Arundinella nepalensis Trin., Sp. Gram. 3: t. 268. 1829.
Common names: reed grass, river grass.

Caespitose perennials with short scaly rhizomes. Culms 60–180 cm long, erect, internodes pubescent; nodes pubescent; butt sheaths papery. Leaves mostly cauline; sheaths glabrous, ligules 0.8–1.2 mm long, eciliate membrane, truncate; blades 8–30 cm long, 3–10 mm wide, linear, flat or convolute, stiff, scaberulous, glabrous, or hirsute, margins scabrous, apex obtuse. Panicles 10–40 cm long, oblong, open or contracted. Spikelets 4–6 mm

long, in pairs, lanceolate; principal lemma awns 4–6 mm long overall, from a sinus, geniculate, with twisted column. Distribution: tropical and temperate Africa, eastward to China and Australia.

29. *Avena sativa** L. subsp. *sativa*

FIGURE 38

*Avena sativa** L., Sp. Pl. 1: 79. 1753.
Common name: oats.

Caespitose annuals. Culms 30–100 cm tall, erect; nodes dark; internodes glossy; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, margins membranous; oral hairs present; ligules 6–8 mm long, membranous, apex lacerate; blades 5–30 cm long, 5–20 mm wide, linear, flat, spreading, scaberulous, margins scabrous, apex acute. Panicles 10–15 cm long, erect, terminal, open drooping, linear, equilateral or nodding. Spikelets 22–27 mm long, cuneate, laterally compressed; lemmas 2.0–3.2 cm long, awns 2.5–3.5 cm long, geniculate, column twisted. Habitat: weed in cultivated areas. Distribution: Eurasia.

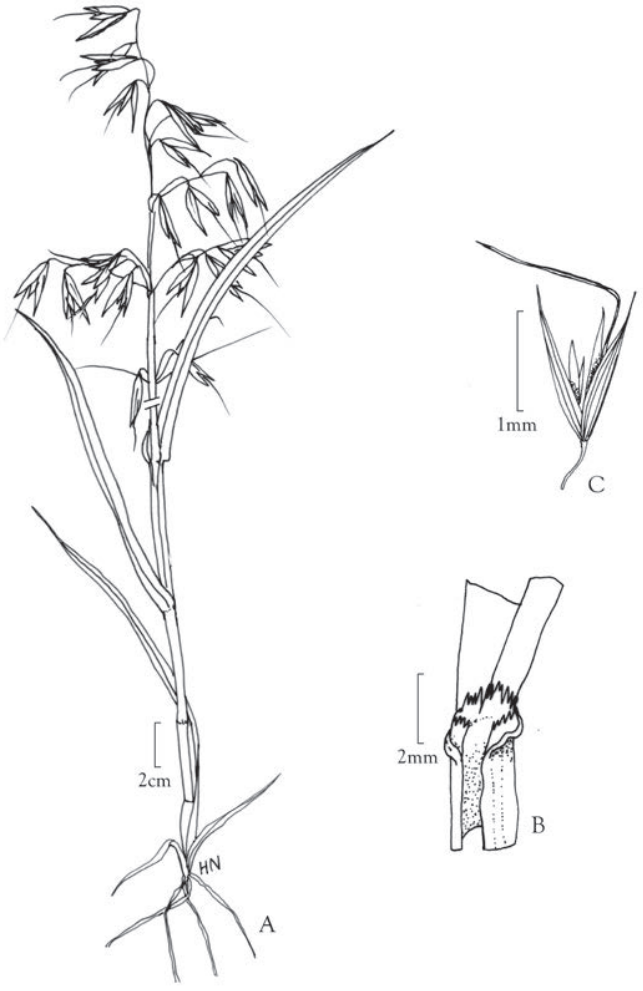


FIGURE 38. *Avena sativa*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *L. F. Ward s.n.* (US-156655); C modified from Baum (2007).

30. *Bambusa vulgaris* Schrad. ex J. C. Wendl.

FIGURE 39

Bambusa vulgaris Schrad. ex J. C. Wendl., Coll. Pl. 2: 26, pl. 47. 1808.
Common names: common bamboo, striped bamboo.

Densely caespitose perennials with short rhizome. Culms woody up to 20 m tall and 4–10 cm thick, erect or geniculately ascending bamboolike, several branches develop from mid-culm nodes and above; internodes smooth; nodes are slightly inflated. Leaves mostly cauline, deciduous; sheaths scabrous or



FIGURE 39. *Bambusa vulgaris*. A. Habit. B. Ligule, sheath, and blade. C. Leaf blades. D. Spikelets. E. Sheath and blade. A–E drawn from *R. E. Vaaghan 1901* (US-1815386).

hispid; auricles falcate; oral hairs ciliate; ligules 3–8 mm long, an eciliate membrane; blades 7–23 cm long, 1–5 cm wide, with a brief petiolelike connection to sheath, lanceolate, glaucous, scabrous, or pubescent, bases cordate, tapering toward midrib, apex acute-acuminate. Panicles 10–40 cm long with spathaceous subtending bracts. Spikelets 10–20 mm long, oblong, laterally compressed, lemma awnless. Distribution: throughout the tropics and subtropics.

31. *Cenchrus americanus* (L.) Morrone

FIGURE 40

Cenchrus americanus (L.) Morrone, Ann. Bot. (Oxford) 106: 127. 2010 [*Cenchrus spicatus* (L.) Cav., *Pennisetum glaucum* (L.) R. Br.].
Common names: *dakhn*; cattail millet, pearl millet.

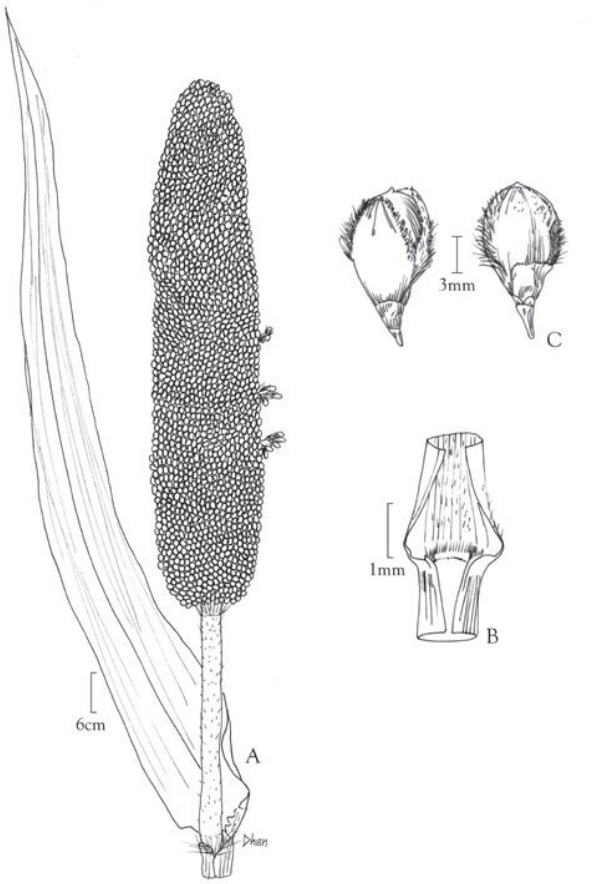


FIGURE 40. *Cenchrus americanus.* A. Flag leaf blade and inflorescence. B. Ligule, sheath, and blade. C. Spikelets with lower (left) and upper (right) glumes. A modified from Ibrahim and Kabuye (1988); B drawn from *R. Dümmer s.n.* (US-634944); C modified from Hitchcock (1951).

Caespitose annuals. Culms up to 300 cm tall robust, rough; butt sheaths glabrous. Leaves basal and cauline; sheaths slightly flattened, hairy on basal ⅓, margins smooth; oral hairs ciliate; collars dark; ligules fringe of hairs; blades 20–100 cm long, 8–50 mm wide, linear, flat or conduplicate, spreading, flaccid, scabrous, hairy on basal ⅓, margins smooth, apex acute. Panicles 4–20 cm long, 0.8–5.5 cm wide, spiciform, linear, elliptic or ovate, partially included in the sheath. Spikelets 3–6 mm long, obovate, dorsally compressed, subtended by involucres of bristles; lemmas awnless. Habitat: weed in cultivated cereal fields. Distribution: Asia.

32. *Cenchrus biflorus* Roxb.

FIGURE 41

Cenchrus biflorus Roxb., Fl. Ind. 1: 238. 1820.
Common names: *cram-cram, uzak*; burgrass, India sandbur.

Caespitose annuals. Culms 10–90 cm tall, erect or ascending; internodes glabrous, glossy, or pubescent; nodes dark

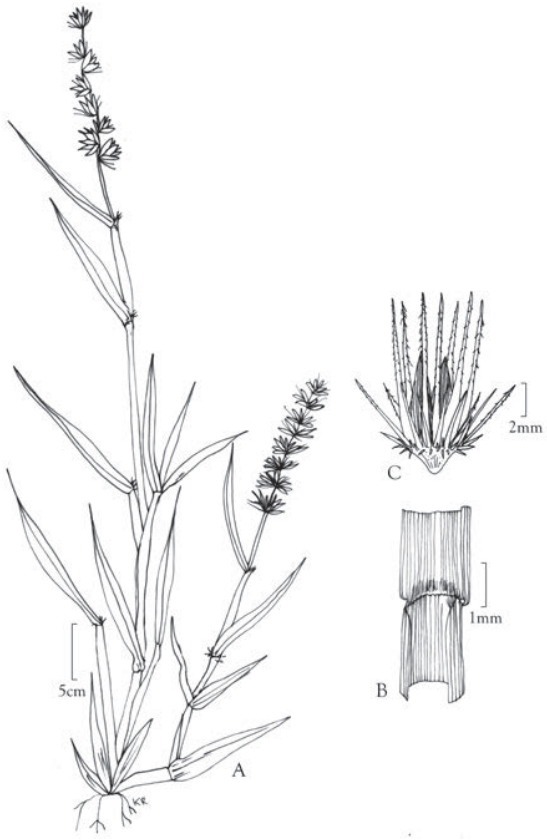


FIGURE 41. *Cenchrus biflorus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 10682* (CAI); B, C drawn from *A. Anderson s.n.* (US 2949200).

colored; lateral branches ample, extravaginal, arising from lower culms or mid culms; butt sheaths glabrous. Leaves basal and cauline; sheaths open for most of their length, flattened, keeled, glabrous, margins smooth; oral hairs present or bearded; collars white, pubescent; ligules 2 mm long, fringe of hairs; blades 2–20 cm long, 1–5 mm wide, linear or lanceolate, sparsely hairy, scabrous, bases simple, broadly rounded or cordate, margins scabrous, apex acuminate. Panicles 2–15 cm long, spiciform; involucres 0.4–1.1 cm long, ovoid; inner bristles flattened united at the base to form a shallow disc 2–4 mm in diameter. Spikelets 3.5–6 mm long, 1–1.5 mm wide, ovate, dorsally compressed, acuminate, subtended by involucres of bristles; lemmas awnless. Distribution: tropical Africa to India.

33. *Cenchrus ciliaris* L.

FIGURE 42

Cenchrus ciliaris L., Mant. Pl. 2: 302. 1771 [*Pennisetum ciliare* (L.) Link].

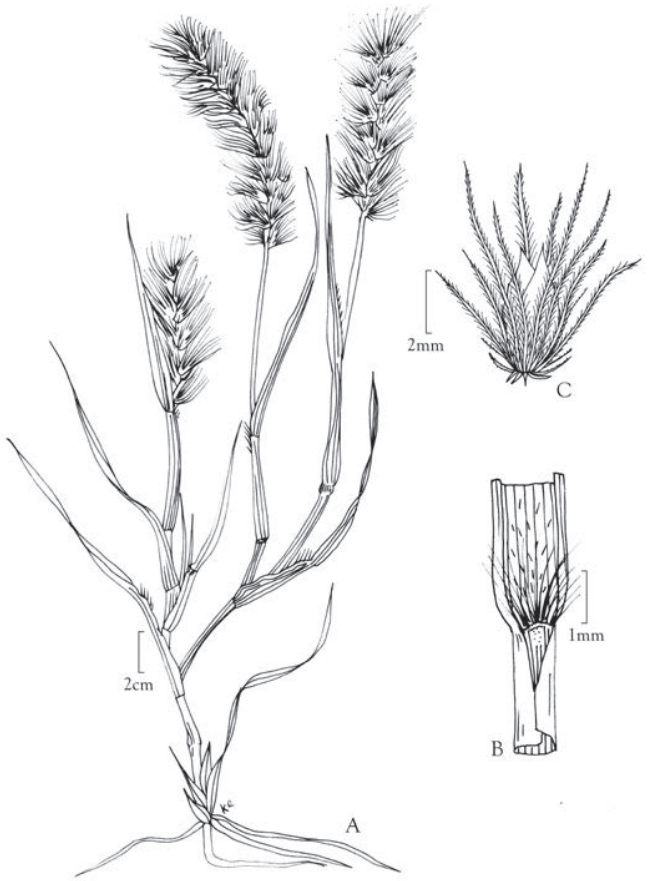


FIGURE 42. *Cenchrus ciliaris*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Abu Raya s.n.* (CAI); B, C drawn from *W. A. Archer 10149* (US-2236373).

Common names: *ebanau, habinni*; biloela buffel grass, blue buffalo grass.

Caespitose perennials; rhizomes short. Culms 10–50 cm tall, 1–4 mm in diameter, wiry, erect, geniculate; internodes sparsely hairy; culms grooved, opposite branches; nodes bearded, sometimes rooting below; butt sheaths pubescent. Leaves basal and cauline; sheaths loose, strongly compressed, open, sparsely hairy, margins smooth; oral hairs present; ligules 1 mm long, fringe of hairs; blades 4–20 cm long, 2–8 mm wide, linear, flat, ascending, stiff, ribbed, scabrous, pilose or glabrous, and glaucous, midribs conspicuous, prominent beneath, margins scabrous, apex acuminate. Panicles 2–14 cm long, 1–2.6 cm wide; involucres 0.6–1.6 cm long, elongated; inner bristles much exceeding the spikelets, one longer and stouter than the rest. Spikelets 2–5.5 mm long, lanceolate, dorsally compressed, acute, subtended by an involucre of bristles; lemmas awnless. Distribution: tropical and southern Africa to India.

34. *Cenchrus hordeoides* (Lam.) Morrone

FIGURE 43

Cenchrus hordeoides (Lam.) Morrone, Ann. Bot. (Oxford) 106: 128. 2010. [*Pennisetum hordeoides* (Lam.) Steud.]

Caespitose annuals. Culms 25–120 cm long, geniculately ascending, slender; lateral branches ample arising from mid culms. Leaves mostly basal; sheaths keeled, loose, hirsute with spreading hairs sometimes tubercle based, often ciliate on the margins, or glabrous and smooth; ligules ciliate membrane, truncate, very short, densely ciliate or reduced to a densely ciliate rim; blades 3–30 cm long; 0.15–1.5 cm wide, linear or linear-lanceolate, flat, green, firm or flaccid, densely hirsute with short spreading tubercle-based hairs, pubescent or glabrescent, scaberulous above and on the margins, gradually narrowed or contracted at bases, apex acute. Panicles 3.5–9 cm long, 0.4–0.6 cm wide (excluding bristles), spiciform, straight, or curved. Spikelets 2.5–4.5 mm long, solitary, subtended by an involucre of bristles, oblong; involucral bristles deciduous; lemma apex obtuse, awnless. Distribution: tropical Africa and Asia.

35. *Cenchrus pedicellatus* (Trin.) Morrone

FIGURE 44

Cenchrus pedicellatus (Trin.) Morrone, Ann. Bot. (Oxford) 106: 128. 2010. [*Pennisetum pedicellatum* Trin. basionym = *Panicum violaceum* Lam.]

Caespitose annuals. Culms 30–150 cm long, geniculately ascending, slender to stout; lateral branches ample, arising from mid culms; internodes glabrous; nodes glabrous, lower nodes rooting; butt sheaths glabrous, scarious. Leaves basal and cauline; sheaths shorter than the internodes, loose, glabrous or pubescent and ciliate on the margins or loosely hairy with tubercle-based



FIGURE 43. *Cenchrus hordeoides.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *Daniel 88* (US-3044962).

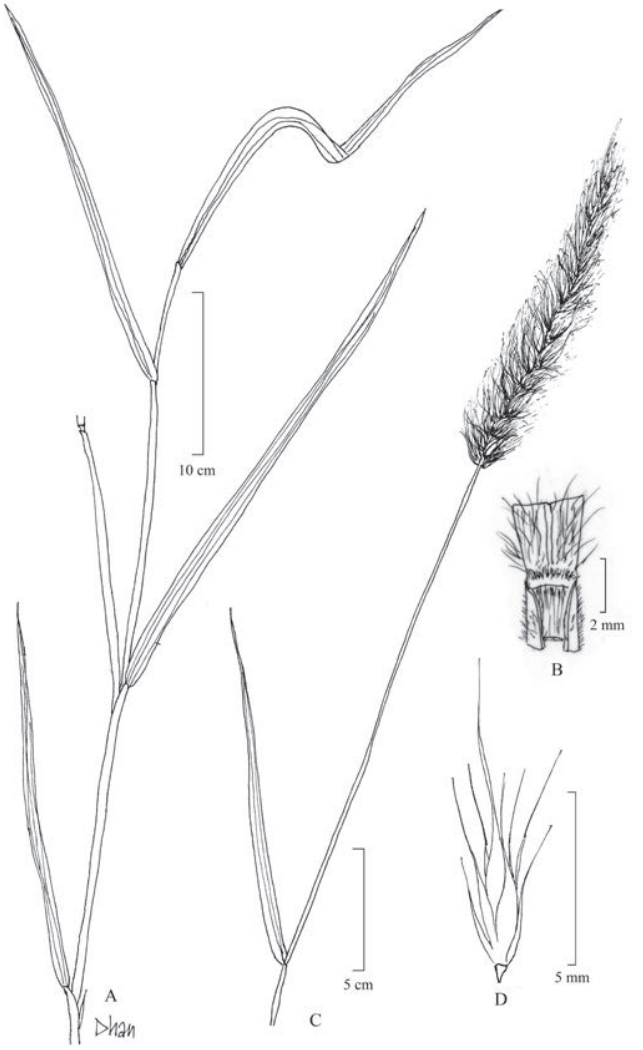


FIGURE 44. *Cenchrus pedicellatus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *Mahous s.n.* (US-1982886).

hairs; ligules ciliate membrane; blades 5–25 cm long, 0.4–1.5 cm wide, flat, linear to linear-lanceolate, rather flaccid, green, glabrous or loosely hairy with tubercle-based hairs, scaberulous, or smooth below, inconspicuous midrib slightly recessed above and protruding slightly below, margin tuberculate-ciliate, cartilaginous, apex acuminate. Panicles 5–15 cm long, spiciform, linear, straight, or curved. Spikelets 5–10 mm long, subtended by an involucre, composed of bristles, ovate, base obtuse, involucral bristles deciduous with the fertile spikelets; lemma apex obtuse. Distribution: tropical Africa, western Indian Ocean, tropical Asia, Australia, and South America.

36. *Cenchrus polystachios* subsp. *atrichus* (Stapf & C. E. Hubb.) Morrone.

FIGURE 45

Cenchrus polystachios subsp. *atrichus* (Stapf & C. E. Hubb.) Morrone, Ann. Bot. (Oxford), n.s. 106: 129. 2010. [*Pennisetum polystachion* subsp. *atrichum* (Stapf and C. E. Hubb.) Brunken]

Caespitose annuals or short-lived perennials. Culms 30–150 cm long, geniculately ascending; branching ample, arising from lower culms often with prop roots; internodes glabrous; nodes dark. Leaves basal and cauline; sheaths keeled, glabrous; ligules ciliate membrane, whitened collar; blades 5–25 cm long, 0.4–1.5 cm wide, lanceolate, scabrous to sparsely hairy, apex acute. Panicles 5–15 cm long, spiciform, linear, straight, or curved. Spikelets 5–10 mm long, subtended by an involucre of bristles, ovate, base obtuse; involucral bristles deciduous with the fertile spikelets; lemma apex obtuse, awnless. Distribution: tropical Africa, western Indian Ocean, tropical Asia, Australia, and South America.

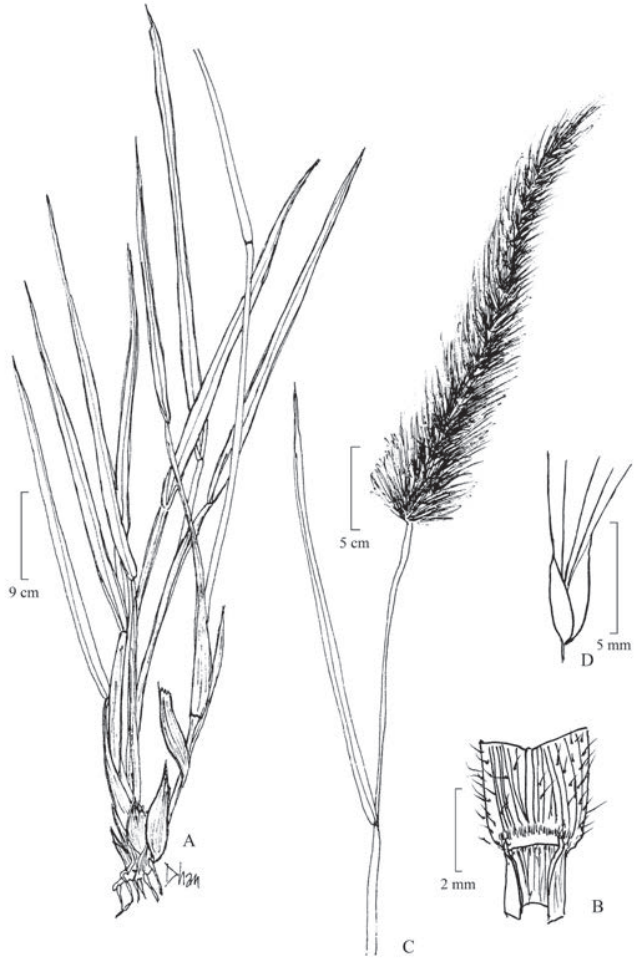


FIGURE 45. *Cenchrus polystachios.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

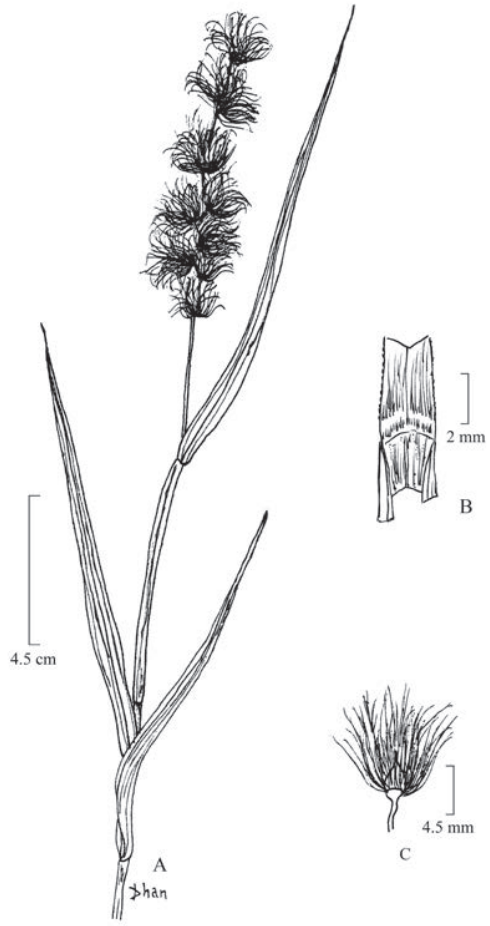


FIGURE 46. *Cechrus prieurii.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1999).

37. *Cenchrus prieurii* (Kunth) Maire

FIGURE 46

Cenchrus prieurii (Kunth) Maire, Bull. Mus. Natl. Hist. Nat. II, 3: 523. 1931.
Common names: *heskanit, wesedj*.

Caespitose annuals. Culms 30–75 cm high, erect or geniculately ascending, moderately slender; branching spreading ample, arising from the mid culms; internodes glabrous; nodes dark. Leaves basal and cauline; sheaths compressed and keeled, scabrous with entire margins; ligules fringe of hairs; blades 9–30 cm long, 0.5–1 cm wide, linear, flat, glaucous, ribbed, scabrous or hairy on basal ⅓, margins, scabrous, crenate, apex acute. Inflorescences 6–14 cm long, spiciform panicle. Spikelets 4–5 mm long, in clusters, subtended by involucres of bristles, ovate, dorsally compressed, acuminate; lemma apex obtuse, or acute, mucronate; lemmas awnless. Distribution: tropical Africa to India.

38. *Cenchrus violaceus* (Lam.) Morrone

FIGURE 47

Cenchrus violaceus (Lam.) Morrone, Ann. Bot. (Oxford), n.s. 106: 130. 2010. [*Pennisetum violaceum* (Lam.) Rich. ex Pers. basionym = *Panicum violaceum* Lam.]

Caespitose annuals forming cushions. Culms 30–300 cm long, erect, or geniculately ascending or decumbent; branched from most nodes; internodes glabrous, semiterete; nodes dark,

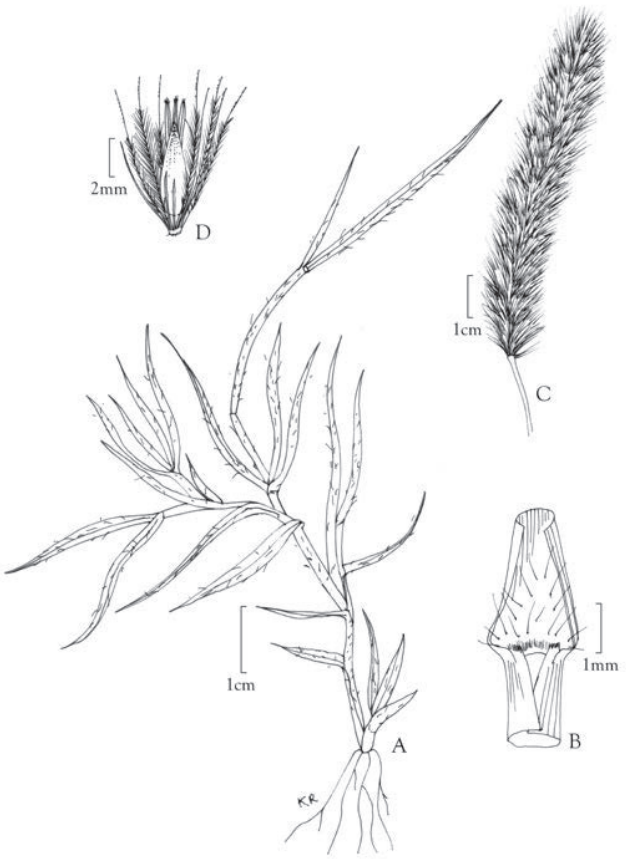


FIGURE 47. *Cenchrus violaceus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *N. El Hadidi s.n.* (CAI); B–D drawn from *J. G. Adam 19906* (US-2464693).

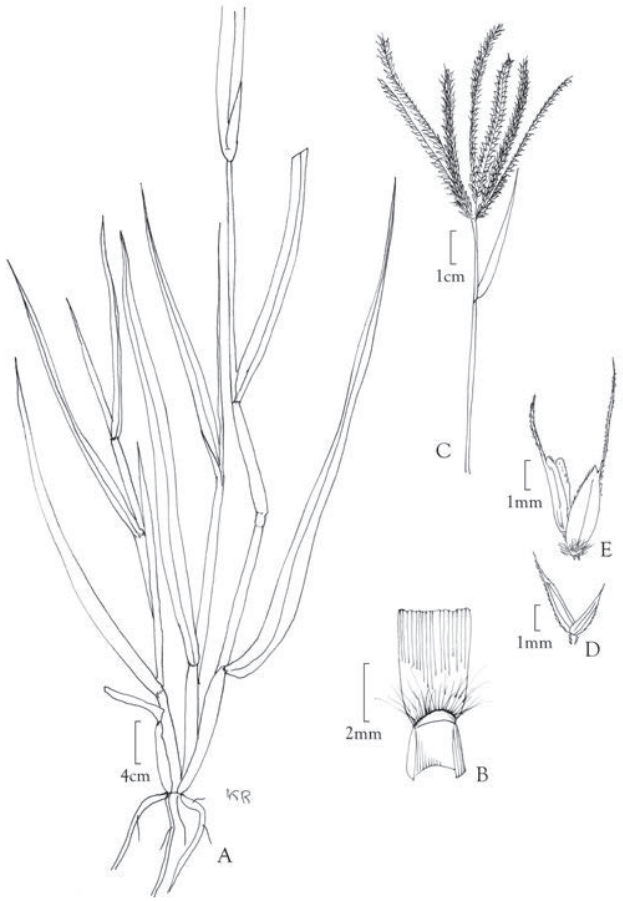


FIGURE 48. *Chloris gayana.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Glumes. E. Spikelets. A, C modified from Ibrahim and Kabuye (1988). B, D, E drawn from *A. J. Oakes 364450* (US-3025905).

lower nodes rooting. Leaves basal and cauline; sheaths flattened, loose, terete, sparingly to densely hirsute with deciduous tubercle-based hairs on lower ⅓; oral hairs present; collars dark; ligules fringe of hairs; blades 15–100 cm long, 0.3–2.5 cm wide, linear, flat, flaccid, green, loosely hirsute with long white hairs, margins cartilaginous and smooth, apex acute. Panicles 2.5–20 cm long, 0.8–2 cm wide, spiciform, linear. Spikelets solitary or paired, subtended by an involucre of bristles; lemma apex obtuse or acute, awnless. Distribution: tropical Africa.

39. *Chloris gayana* Kunth

FIGURE 48

Chloris gayana Kunth, Révis. Gramin. 1: 293, pl. 58. 1830.
Common names: Hunyani grass, Rhodes grass.

Caespitose perennials; stolons present. Culms up to 200 cm tall, erect, geniculate; internodes glabrous, striate; with or without lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths strongly compressed, keeled, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 15–25 cm long, 2–9 mm wide, linear, flat, ascending, hairy on the basal ⅓, margins smooth, apex attenuate. Inflorescences 4–15 cm long, with (5–)7–20 digitately arranged racemes; racemes spreading or ascending. Spikelets 2.5–4 mm long, 3–4 flowered, packed broadside to rachis, cuneate, laterally compressed; fertile lemmas 2.9–3.2 mm long, awns 1.5–5.5 mm long, straight, bristly. Distribution: tropical and southern Africa.

40. *Chloris pilosa* Schumach.

FIGURE 49

Chloris pilosa Schumach., Beskr. Guin. Pl. 55. 1827.
Common names: *babunsi, mbonsi*; goat's beard.

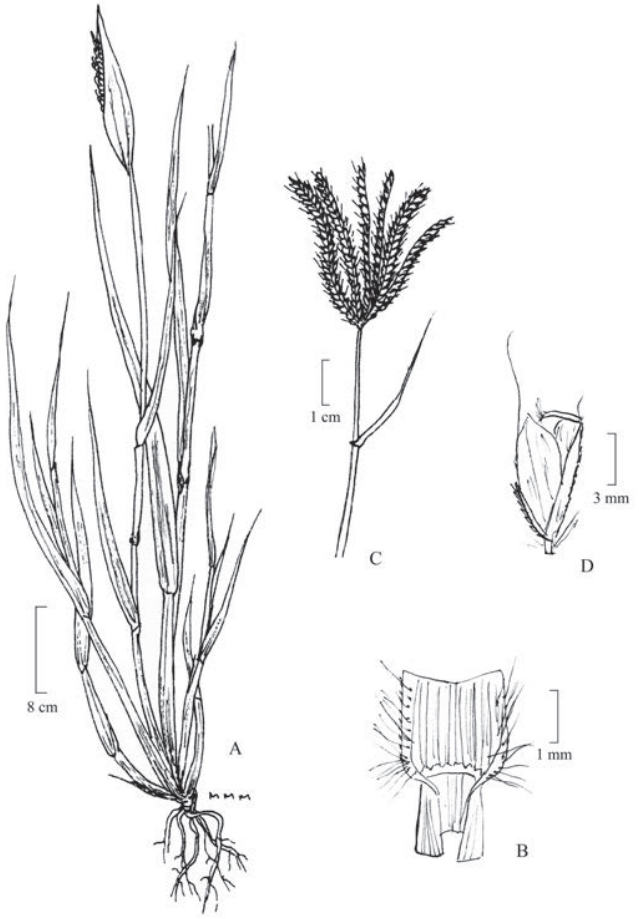


FIGURE 49. *Chloris pilosa*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *J. T. Baldwin Jr. 11228* (US-2673081).

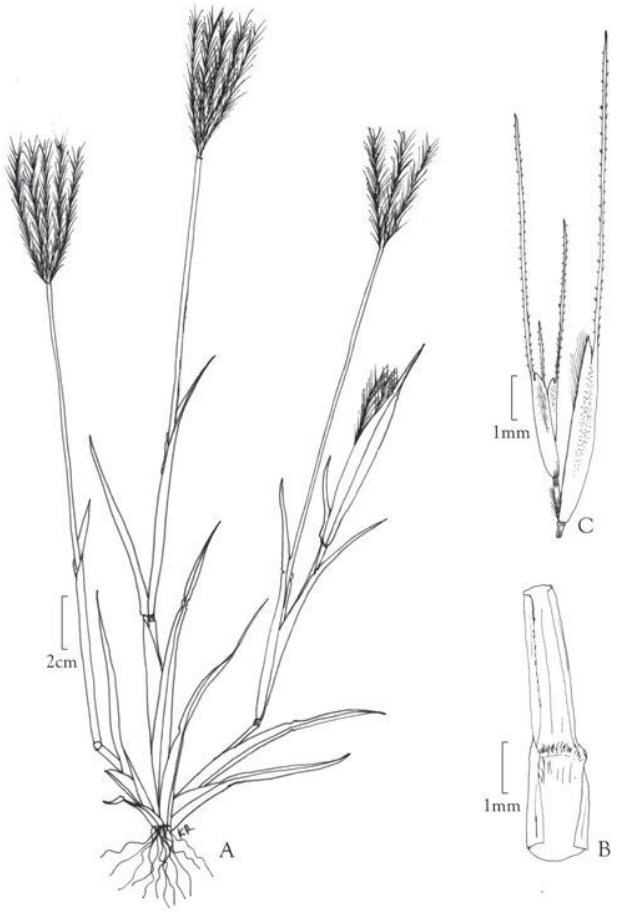


FIGURE 50. *Chloris prieurii*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *G. Tackholm s.n.* (CAI); B, C drawn from *S. Laegaard & S. Traore 17061* (US-3595001).

Caespitose annuals. Culms 30–100 cm high, robust, erect or geniculately ascending or decumbent, with or without rooting from the lower nodes; branching ample, arising from mid nodes. Leaves basal and cauline; sheaths flattened or keeled, glabrous with entire margins; collars whitened, ciliate; ligules ciliolate membrane; blades 5–30 cm long, 0.2–0.5 cm wide, flat or folded, glabrous, bases slightly rounded tapering to a fine point. Inflorescences with 6–13 loosely digitate racemes; racemes 2.5–8.5 cm long. Spikelets 2.5–3 mm long, solitary, cuneate, laterally compressed; principal lemma awns 2.5–5 mm long, subapical. Distribution: tropical Africa to Australia.

41. *Chloris prieurii* Kunth

FIGURE 50

Chloris prieurii Kunth, Révis. Gramin. 2: 441, t. 134. 1831. [*Enteropogon prieurii* (Kunth) Clayton]

Caespitose annuals. Culms 40–85 cm long, erect, or geniculately ascending; branching from lower culms; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous; ligules ciliolate membrane; blades 10–30 cm long, 0.2–0.5 cm wide, linear, flat, glaucous, glabrous, apex acuminate. Racemes 4–12 cm long, 4–9 in number, digitate, unilateral, rachis angular. Spikelets 3–5 mm long, packing broadside to rachis, regular, 2-rowed, lemma apex dentate, bifid, awned, 1-awned, principal lemma awns 7–25 mm long. Distribution: tropical Africa, Macronesia, temperate and tropical Asia to India.

42. *Chloris virgata* Sw.

FIGURE 51

Chloris virgata Sw., Fl. Ind. Occid. 1: 203. 1797.

Common names: feather finger grass, white grass, windmill grass.

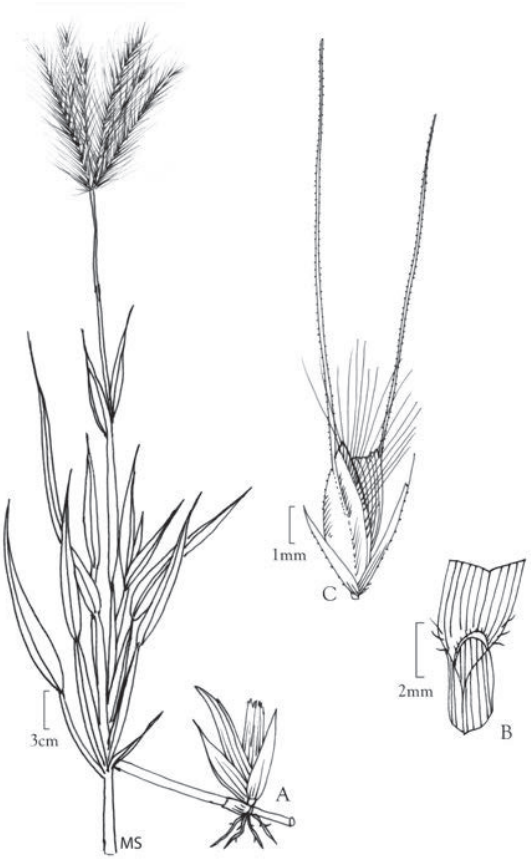


FIGURE 51. *Chloris virgata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Tackholm, L. Boulos & M. Zahran 204, 206* (CAI); B drawn from Poilecot (1995); C drawn from *B. Wennell* (US-1446109).

Caespitose annuals. Culms up to 100 cm tall, erect, geniculate; internodes glabrous, straw colored; nodes dark, occasionally lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, strongly compressed, keeled, glabrous, margins hairy at junction between blade and sheath; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 10–25 cm long, 2–6 mm wide, linear, flat, ascending, glabrous, margins smooth, apex attenuate. Inflorescences composed of 4–12 racemes; racemes 2–10 cm long, digitate, spreading. Spikelets 2.5–4.5 mm long, 3-flowered, cuneate, laterally compressed; fertile lemmas 2–3.6 mm long with a crown of hairs at the apex, the hairs 1.5–4 mm long, awns 5–12 mm long, straight. Distribution: throughout the tropics.

43. *Chrysochloa hindsii* C. E. Hubb.

FIGURE 52

Chrysochloa hindsii C. E. Hubb., Kew Bull. 4: 349. 1949.

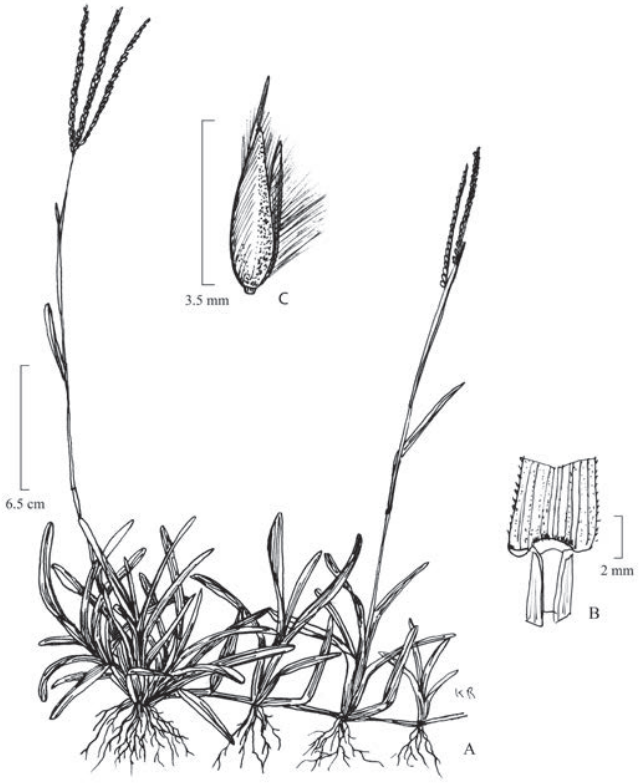


FIGURE 52. *Chrysochloa hindsii.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *R. Rose-Innes GC30939* (US-2380909).

Variable solitary or caespitose, usually stoloniferous. Culms up to 70 cm high geniculately ascending or decumbent, wiry, branching spreading, arising from midculm, rooting at lower nodes. Leaves basal and cauline; sheaths glabrous, keeled or strongly compressed; ligules ciliolate membrane; blades 0.8–15 cm long, 0.2–0.6 cm wide, flat, glabrous, margins smooth or slightly scabrid, apex abruptly rounded. Inflorescences composed of 2–4(–5) digitately arranged racemes; racemes 1–12 cm long. Spikelets 3–4 mm long, solitary, ovate, laterally compressed, compressed strongly; principal lemma awns 1–2.5 mm long overall, subapical. Distribution: tropical Africa.

44. *Chrysopogon fulvibarbis* (Trin.) Veldkamp

FIGURE 53

Chrysopogon fulvibarbis (Trin.) Veldkamp, Austrobaileya 5: 525. 1999.

Caespitose perennials with short rhizomes. Culms erect, basal innovation intravaginal, flabellate. Leaves cauline; sheath glabrous; ligules fringe of hairs; blades linear, flat, scabrous,

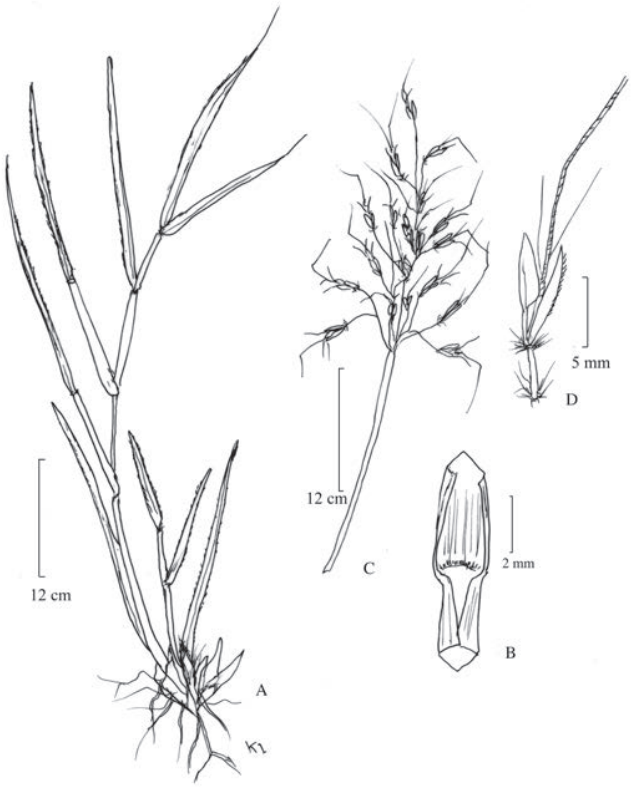


FIGURE 53. *Chrysopogon fulvibarbis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *G. A. Oduro 401* (US-2208988).

margins scabrous, apex acuminate. Panicles 10–20 cm long, open, lanceolate; racemes 4–8 cm long linear; laterally slightly compressed. Spikelets 6–8 mm long in pairs; principal lemma awns 10–20 mm long overall, from a sinus, geniculate, clearly exserted from spikelet, with a straight or slightly twisted column. Distribution: tropical West Africa.

45. *Chrysopogon nigritanus* (Benth.) Veldkamp

FIGURE 54

Chrysopogon nigritanus (Benth.) Veldkamp, Austrobaileya 5: 526. 1999.

Caespitose perennials with short rhizomes. Culms 150–300 cm high, erect, unbranched; internodes glabrous. Leaves basal and cauline; sheaths glabrous; ligules scarious with shortly ciliate margins or a line of hairs on an extremely short scarious rim; blades up to 90 cm long, 0.7 cm wide, linear, flat, scabrid, apex acuminate. Inflorescence an open panicle, 15–40 cm long, lanceolate. Spikelets 7 mm long in pairs, narrowly linear-lanceolate; principal lemma awnless. Distribution: tropical Africa.



FIGURE 54. *Chrysopogon nigritanus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *P. A. Smith 2685* (US-3193087).

46. *Coelachyrum brevifolium* Hochst. & Nees

FIGURE 55

Coelachyrum brevifolium Hochst. & Nees, Linnaea 16: 221. 1842.

Caespitose annuals; stolons present. Culms 10–50 cm tall, geniculate; internodes glabrous, striate, straw colored; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, glabrous, margins membranous; ligules 1–2 mm long, membranous, apex dentate; blades 2–5 cm long, 1.5–4 mm wide, glabrous, margins wavy, smooth, bases rounded, apex acuminate. Inflorescences 1–5 cm long with 3–5 digitate racemes. Spikelets 3.5–4 mm long, ovate, laterally compressed, subsessile; lemmas 1.6–2.2 mm long, membranous,

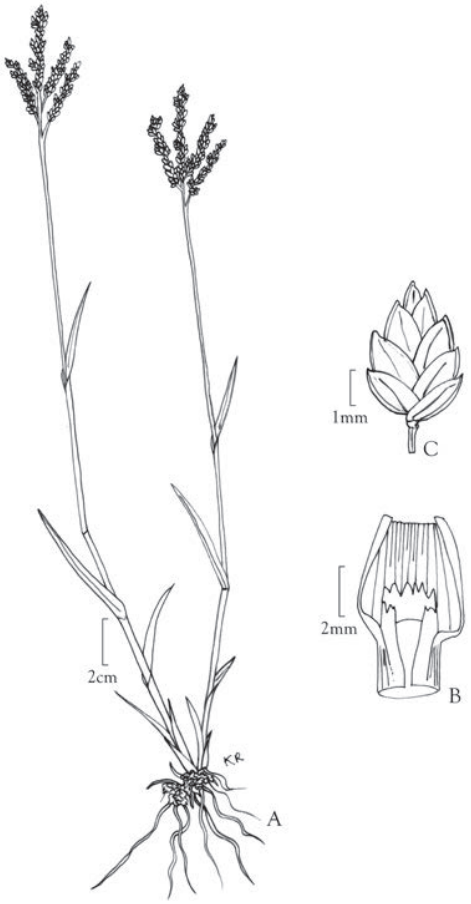


FIGURE 55. *Coelachyrum brevifolium.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Tackholm, M. Kassas, H. Fawzy, F. Salaby & M. Zahran 1402* (CAI); B drawn from *F. N. Andrews 26* (US-30248192); C modified from Cope (2005).



FIGURE 56. *Coix lacryma-jobi.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from *M. Hassib s.n.* (CAI); Ibrahim and Kabuye (1988); B drawn from *W. R. Luke 3305* (US-3262016).

pilose, awnless. Habitat: sandy soils. Distribution: northern Africa and Arabia.

47. *Coix lacryma-jobi* L.

FIGURE 56

Coix lacryma-jobi L., Sp. Pl. 2: 972. 1753.
Common names: corn bead, Job's tears, pearl barley.

Caespitose annuals; plants monoecious. Culms up to 200 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves mostly cauline; sheaths strongly compressed, keeled, glabrous, margins smooth; ligules 1–2 mm long, membranous, apex truncate; blades 10–50 cm long, 2–5 cm wide, linear-lanceolate, flat, spreading, flaccid, glabrous, margins cartilaginous, bases cordate, apex acute. Inflorescences axillary, compound; male and female racemes subtended by the same spatheole; female racemes sessile subtended by a bony utricle comprising 1 spikelet, male racemes pedunculate projecting from the mouth of the utricle comprising 3 or 2 spikelets. Fertile utricles 0.5–1.5 cm long, globose; male racemes 3–5 cm long, the spikelets 7–9 mm long, dorsally compressed; lemmas awnless. Habitat: cultivated or escaped. Distribution: tropical Asia.

48. *Ctenium elegans* Kunth

FIGURE 57

Ctenium elegans Kunth, Révis. Gramin. 1: 295. 1830.
Common names: *samu saana, wolo kaman.*

Caespitose annuals. Culms 90–120 cm long, geniculately ascending; branching ample, arising from the lower culms. Leaves basal and cauline; sheaths scabrous; ligules eciliate membrane, apex erose; blades 20–30 cm long, 0.1–0.3 cm wide, aromatic, linear, flat, flaccid, scabrous, apex acuminate.



FIGURE 57. *Ctenium elegans*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. Laegaard, H. Mipro & T. Sobere 18359* (US-3432616).



FIGURE 58. *Ctenium newtonii.* A. Habit. B. Inflorescence. C. Ligule, sheath, and blade. D. Spikelet. A–D drawn from *S. Laegaard, H. Mipro & T. Sobere 18327* (US-3432607).

Inflorescence a single raceme; racemes 20–30 cm long, straight, unilateral. Spikelets 4–6 mm long, solitary, packed broadside to rachis, crowded, regular, 2-rowed; principal lemma awns 6–10 mm long overall, subapical. Distribution: tropical Africa, temperate Asia.

49. *Ctenium newtonii* Hack.

FIGURE 58

Ctenium newtonii Hack., Bol. Soc. Brot. 5: 220. 1887.
Common name: *wolo kaman*.

Caespitose perennials. Culms 50–100 cm high, wiry, geniculately ascending; branching ample arising from the lower nodes. Leaves basal and cauline; sheaths glabrous to hairy; ligules eciliate membrane with erose apex; blades 5–25 cm long; 0.2–0.4 cm wide, aromatic, linear, involute, glabrous, margins scabrous, apex attenuate. Inflorescence a single raceme; racemes (5)7–20(–30) cm long, straight or almost straight to coiled, unilateral. Spikelets 4–7 mm long, solitary; principal lemma awns 2.5–3 mm long, apex minutely bidentate. Distribution: tropical East and West Africa.

50. *Ctenium villosum* Berhaut

FIGURE 59

Ctenium villosum Berhaut, Mém. Soc. Bot. France 1953–1954: 10. 1954.

Caespitose delicate annuals. Culms 40–70 cm high, glands wartlike, geniculately ascending. Leaves basal and cauline; sheaths glabrous; ligules eciliate membrane; blades 5–10 cm long; 0.1–0.2 cm wide, linear, involute, glabrous to hairy, margins slightly scabrid, apex acuminate. Inflorescence composed of a single raceme; racemes 2–10 cm long, tightly spiraled, unilateral. Spikelets 5 mm long, solitary, packed broadside to rachis, crowded, regular, 2-rowed; principal lemma awns 2 mm long, subapical. Distribution: tropical West Africa.

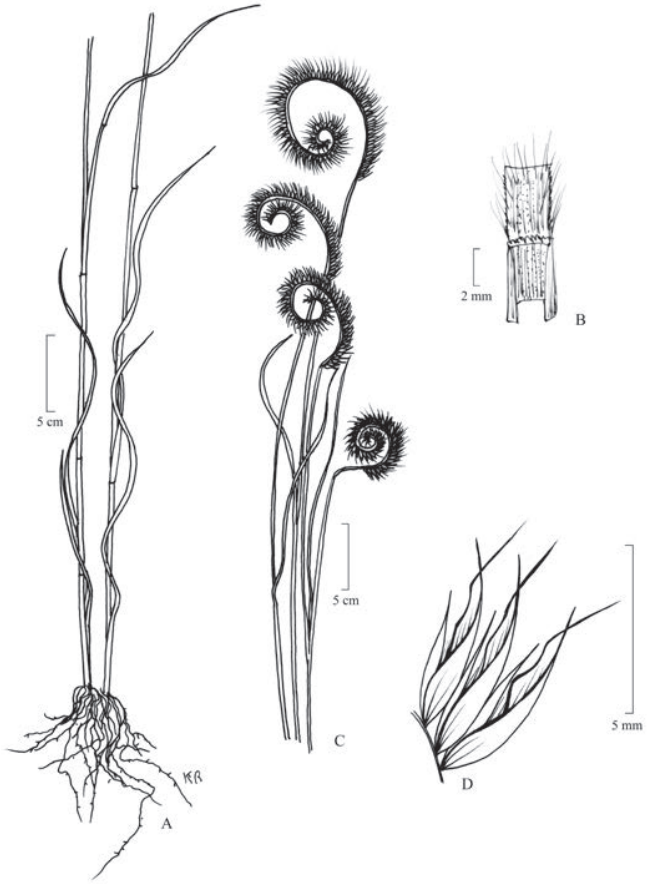


FIGURE 59. *Ctenium villosum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Lecord 258* (US-2597782).

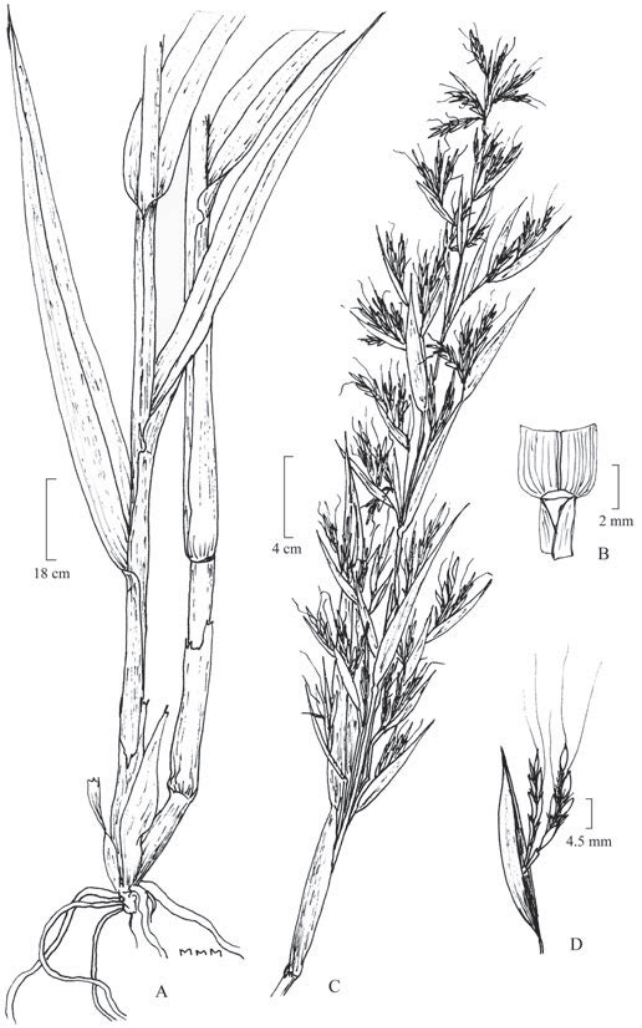


FIGURE 60. *Cymbopogon caesius.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Gibbs Russell & Smook 5460* (US-3510547).

51. *Cymbopogon caesius* (Nees ex Hook. & Arn.) Stapf

FIGURE 60

Cymbopogon caesius (Nees ex Hook. & Arn.) Stapf, Bull. Misc. Inform. Kew 1906: 341. 1906. [*Cymbopogon giganteus* Chiov.]

Common names: buchu grass, inchi grass, kachi grass.

Caespitose perennials. Culms 100–300 cm long, with prop roots, erect, robust; branching ample, arising from lower culms; butt sheaths withering; internodes glabrous; nodes dark. Leaves basal and cauline; sheath glabrous, ribbed, the basal sheaths soon falling away; ligules 0.3–2 mm long, eciliate membrane, truncate, scarious; blades 15–60 cm long, 0.8–3 cm wide, linear or lanceolate, herbaceous, dark green, aromatic, glabrous and smooth, bases cordate to subamplexicaul, apex attenuate. Inflorescences composed of racemes, subtended by a spatheole; racemes 10–15 mm long. Spikelets 3.5–5 mm long, in pairs; principal lemma awns 10–17 mm long, from a sinus, geniculate, with twisted column. Distribution: tropical Africa.

52. *Cymbopogon schoenanthus* (L.) Spreng.

FIGURE 61

Cymbopogon schoenanthus (L.) Spreng., Pl. Min. Cogn. Pug. 2: 15. 1815.



FIGURE 61. *Cymbopogon schoenanthus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *G. Täckholm s.n.* (CAI); B drawn from *Y. Hu 8328* (US-2722032).

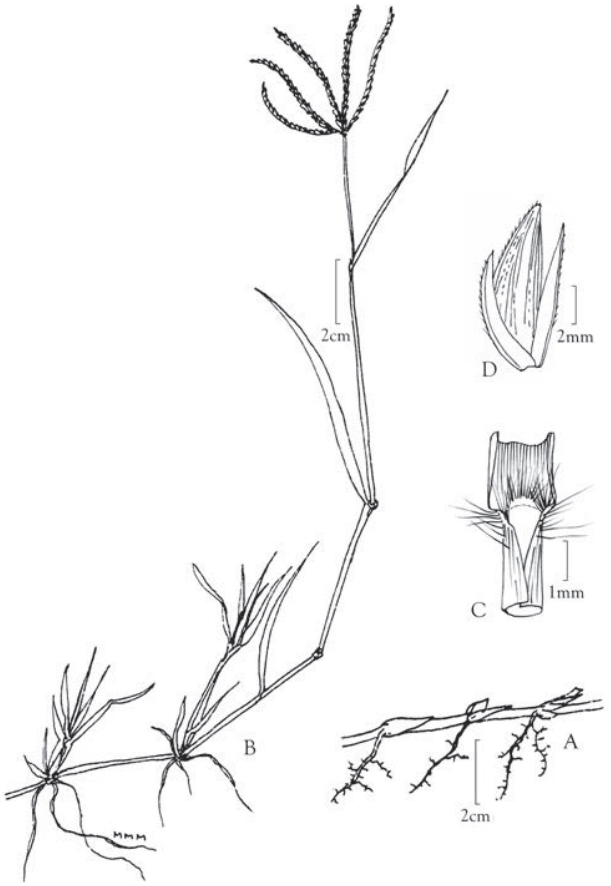


FIGURE 62. *Cynodon dactylon.* A. Stolon. B. Habit. C. Ligule, sheath, and blade. D. Spikelet. A, C drawn from *Raclare Kanal 432* (US-3279031); B modified from Ibrahim and Kabuye (1988); D modified from Hitchcock (1951).

Common names: *lemmad, taberimt*; camel grass, gingergrass, lemon grass.

Caespitose, aromatic perennials. Culms 30–80 cm tall, erect; internodes glabrous, glossy; nodes dark, bearded; butt sheaths glabrous, persistent. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 1–3 mm long, membranous with erose apex; blades 10–35 cm long, 1–4 mm wide, filiform, spreading, involute, scaberulous, margins scabrous, bases narrow, apex attenuate to spiny, pungent. Panicles 5–40 cm long, dense, composed of racemes 1–3 cm long, terminal and axillary, subtended by a spatheole, enclosed in the sheath, paired, deflexed. Spikelets 4–7 mm long, in pairs, lanceolate, dorsally compressed; principal lemma awns 5–9 mm long, straight. Distribution: Sahara to Arabia.

53. *Cynodon dactylon* (L.) Pers.

FIGURE 62

Cynodon dactylon (L.) Pers., Syn. Pl. 1: 85. 1805.

Common names: *kiki, zozobu*; Bahama grass, Bermuda grass, Scotch grass.

Mat-forming perennials; stolons present; rhizomes elongated. Culms 10–40 cm tall, erect; internodes glabrous, glossy; lower nodes rooting; butt sheaths glabrous, persistent. Leaves basal and cauline; sheaths longer than adjacent internodes, glabrous, ribbed, margins smooth; ligules 0.3 mm long, ciliate membrane; oral hairs present; blades 3–15 cm long, 2–4 mm wide, linear or loosely convolute, spreading, scaberulous, glabrous or

pilose, margins sparsely hairy and scabrous, apex acuminate. Racemes 1.5–6(–8) cm long, 4–6 in number, digitately arranged, erect, unilateral. Spikelets 2–2.6 mm long, lanceolate, laterally compressed; lemmas silky pubescent on the keel, awnless. Distribution: tropical and warm temperate regions; cosmopolitan.

54. *Dactyloctenium aegyptium* (L.) Willd.

FIGURE 63

Dactyloctenium aegyptium (L.) Willd., Enum. Pl. 2: 1029. 1809.
Common names: *burugal, keenie ana*; buffalo grass, Egyptian grass, finger comb grass.

Mat-forming or caespitose annuals; stolons present. Culms 10–50 cm tall, erect, geniculate; internodes glabrous; lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths open, somewhat glabrous, compressed, the basal ones keeled, inconspicuously sparsely hairy, margins smooth; ligules 1–3 mm long, membranous; blades 3–20 cm long, 25–50 mm wide, broadly linear, flat, ascending, margins ciliate with bulbous base hairs, apex acuminate. Inflorescences with 3–9 digitately arranged, unilateral racemes 1.2–6.5 cm long, spreading or ascending. Spikelets 3.5–4.5 mm long, laterally compressed; upper glumes 1.5–2.2 mm long with a terminal, flexuous awn, the awn 0.8–4 mm long; lemmas 2.6–4 mm long, mucronate. Distribution: tropical and warm temperate regions of Eastern Hemisphere.

55. *Dichanthium annulatum* (Forssk.) Stapf

FIGURE 64

Dichanthium annulatum (Forssk.) Stapf, Fl. Trop. Afr. 9: 178. 1917.



FIGURE 63. *Dactyloctenium aegyptium.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B drawn from *S. Laegaard 16166B* (US-3292800); C modified from Hatch (2003).



FIGURE 64. *Dichanthium annulatum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *F. R. Fosberg 56909* (US-2832090).

Common names: *ebastan*; Angleton grass, Delhi grass, Santa Barbara grass,

Caespitose perennials. Culms 20–100 cm tall, decumbent; internodes hirsute; nodes conspicuously bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, striate, margins hairy; oral hairs present; ligules 3–6 mm long, membranous, apex obtuse; blades 3–30 cm long, 2–6 mm wide, linear, flat; ascending to appressed, pilose above, margins cartilaginous, bases cordate, apex acuminate. Inflorescence composed of (1–)2–15 subdigitately arranged racemes; racemes 3–7 cm long. Spikelets 2–6 mm long, in pairs, oblong, dorsally compressed; lower glume of sessile spikelet not pitted; principal lemma awns 8–25 mm long, column twisted. Distribution: tropical Africa and Indonesia.

56. *Dichanthium foveolatum* (Delile) Roberty

FIGURE 65

Dichanthium foveolatum (Delile) Roberty, Boissiera 9: 170. 1960.
Common names: *okras, tirichit, tirikit*.



FIGURE 65. *Dichanthium faveolatum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets. A drawn from *V. Täckholm 1606* (CAI); B–D drawn from *W. Zeller 402* (US-3213846).

Caespitose perennials. Culms 10–50 cm tall, erect, geniculate, wiry; internodes glabrous, glossy; nodes bearded; butt sheaths scarious, pubescent. Leaves basal and cauline; sheaths longer than blades, glabrous, basal hairy and striate, margins membranous; auricles clawlike; ligules 1–3 mm long, ciliate membrane; blades 3–20 cm long, 1–4 mm wide, linear, flat, flaccid, spreading, glabrous, margins smooth, bases narrow, apex acuminate. Inflorescence a single raceme, spatheolate; spatheoles 3.5–5 cm long; racemes 1.5–4.5 cm long, partially enclosed in the sheath. Spikelets 2.5–4 mm long, in pairs, elliptic, dorsally compressed; lower glume of sessile spikelet pitted; principal lemma awns 12–18 mm long, geniculate, column twisted. Distribution: East Africa to India.

57. *Diectomis fastigiata* (Sw.) P. Beauv.

FIGURE 66

Diectomis fastigiata (Sw.) P. Beauv., Ess. Agrostogr., 132, 160. 1812. [*Andropogon fastigiatus* Sw.]
Common name: foldedleaf grass.



FIGURE 66. *Diectomis fastigiata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Joln Sihvonen 261* (US-2789234).

Caespitose or solitary annuals. Culms 15–200 cm high, erect; branches lacking. Leaves mostly cauline; sheaths glabrous; ligules more than 6 mm long, eciliate membrane with acute apex and pink color; blades 5–30 cm long, 1–4 mm wide, linear, flat or conduplicate, smooth margins, bases almost with false petioles, apex attenuate. Inflorescence a single raceme; racemes 2–5 cm long gathered into a leafy panicle; subtended by a spatheole. Fertile spikelets 4–5 mm long, elliptic or oblong, dorsally compressed, sessile; sterile spikelets 5–9 mm long; principal lemma awns 25–40 mm long from a sinus, geniculate, with twisted glabrous column. Distribution: Western Hemisphere.

58. *Digitaria acuminatissima* Stapf

FIGURE 67

Digitaria acuminatissima Stapf, Fl. Trop. Afr. 9: 441. 1919.

Caespitose annuals. Culms over 60–120 cm high, rather stout; erect or decumbent; internodes glabrous; nodes glabrous, dark; lower nodes rooting. Leaves basal and cauline; sheaths longer than blades, somewhat loose and firm, glabrous and smooth or with a very few tubercle-based hairs near the mouth; ligules about 2 mm long, short, rounded, membranous; blades 3–25 cm long, 0.3–1 cm wide, flat, rather firm, linear from slightly narrowed base, distinct white midrib for ½ their length, gradually tapering to a very acute point, flexuous, quite glabrous or with a few tubercle-based hairs near the base, slightly rough on both sides, margins finely cartilaginous and rough. Inflorescence composed of (2)5–14 racemes; racemes 12–20 cm long. Spikelets 2.8–3.7 mm long, oblong-lanceolate, in pairs; lemmas awnless. Distribution: tropical Africa.

59. *Digitaria aristulata* (Steud.) Stapf

FIGURE 68

Digitaria aristulata (Steud.) Stapf, Fl. Trop. Afr. 9: 471. 1919.

Caespitose annuals. Culms 5-20 cm high, slender; internodes glabrous; nodes dark, pubescent, or bearded; lower nodes rooting and branching. Leaves mostly cauline; sheaths longer than leaf blade, somewhat loose, the lower of the primary culms usually slipping off the culms, softly hairy; ligules ciliolate membrane; blades 1–3 cm long, 0.2–0.3 mm wide, linear, flat, softly

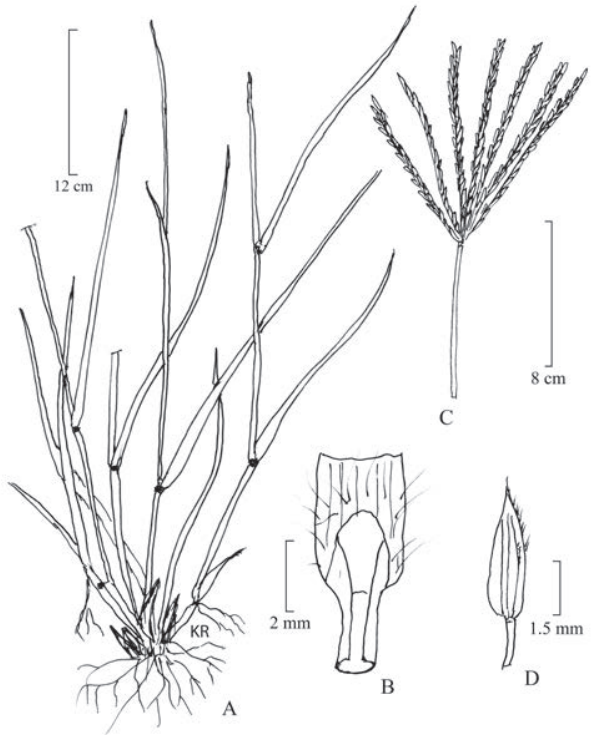


FIGURE 67. *Digitaria acuminatissima.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *H. L. Shantz 566* (US-1297250).

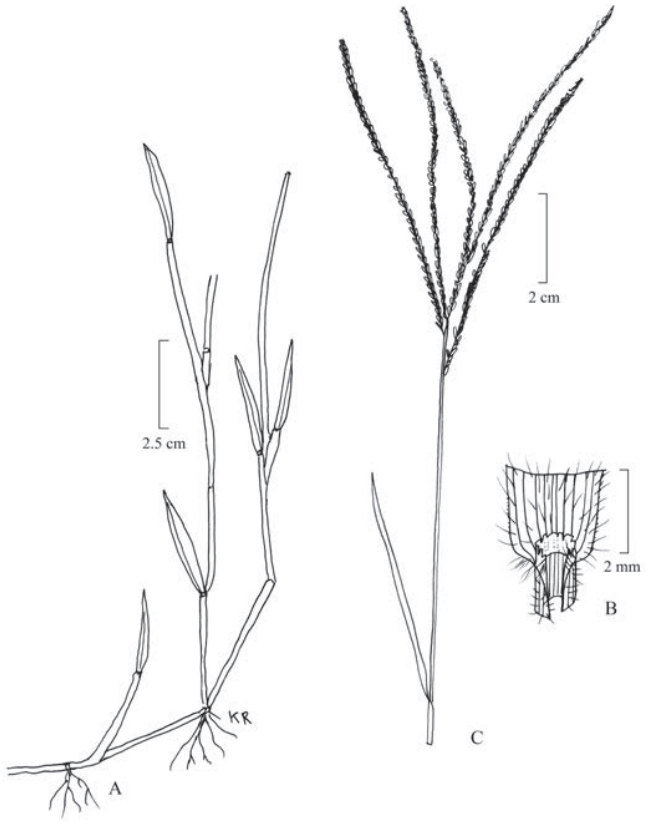


FIGURE 68. *Digitaria aristulata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *Delessert Kunth 4065* (US-1126077).

and loosely hairy, margins finely cartilaginous and scaberulous, sometimes slightly rounded base, tapering to an acute point. Inflorescences digitate racemes; racemes 3–5, sessile, 3–5 cm long. Spikelets 1.7 mm long, in pairs, oblong, dorsally compressed, acuminate, falling entire; principal lemma awns subapical, straight without column. Distribution: tropical West Africa.

60. *Digitaria barbinodis* Henrard

FIGURE 69

Digitaria barbinodis Henrard, Monogr. Digitaria, 67. 1950.

Caespitose annuals. Culms 30–50 cm long, geniculately ascending. Internodes glabrous; nodes bearded. Leaves mostly cauline; sheath glabrous; ligules 1–2 mm long, eciliate membrane; blades 5–10 cm long, 0.2–0.4 cm wide, linear, glabrous, flat. Inflorescences composed of 4–5 racemes, digitately inserted; racemes 5–10 cm long, unilateral. Spikelets 5–10 cm long, in pairs; lemmas awnless. Distribution: tropical West Africa.

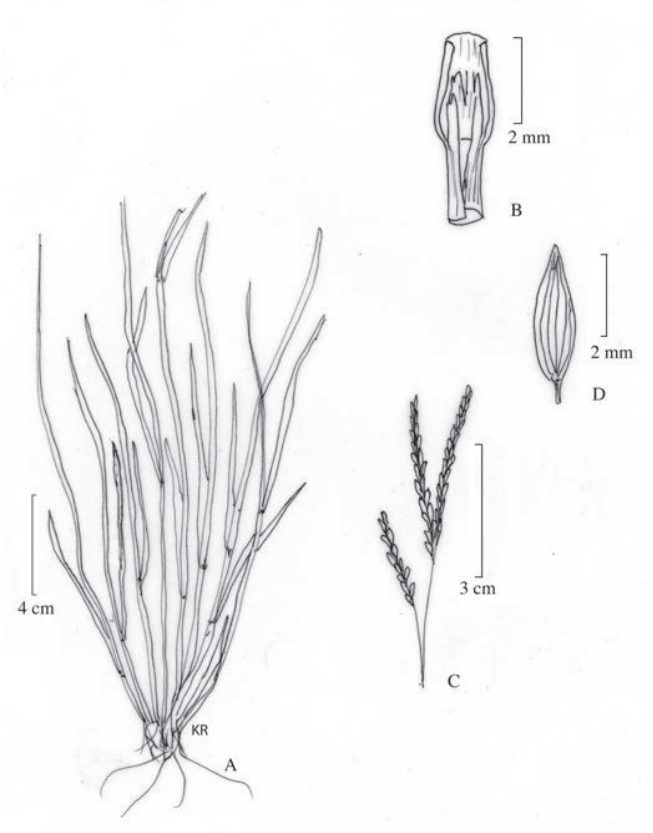


FIGURE 69. *Digitaria barbinodis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *W. D. Clayton s.n.* (000211693).

61. *Digitaria ciliaris* (Retz.) Koeler

FIGURE 70

Digitaria ciliaris (Retz.) Koeler, Descr. Gram. 27. 1802.
Common names: bamboo grass, summer grass, wild crab grass.

Caespitose annuals. Culms 10–80 cm tall, decumbent; internodes glabrous, tough; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths pubescent, margins smooth; oral hairs present; ligules 1–3 mm long, membranous, apex obtuse, lacerate; blades 3–20 cm long, 3–8 mm wide, linear, flat, ascending, glabrous, margins wavy, smooth, apex acuminate. Inflorescence composed of 2–12 digitately or subdigitately arranged, unilateral racemes; racemes 6–22 cm long. Spikelets (2–)2.5–3.3(–3.7) mm

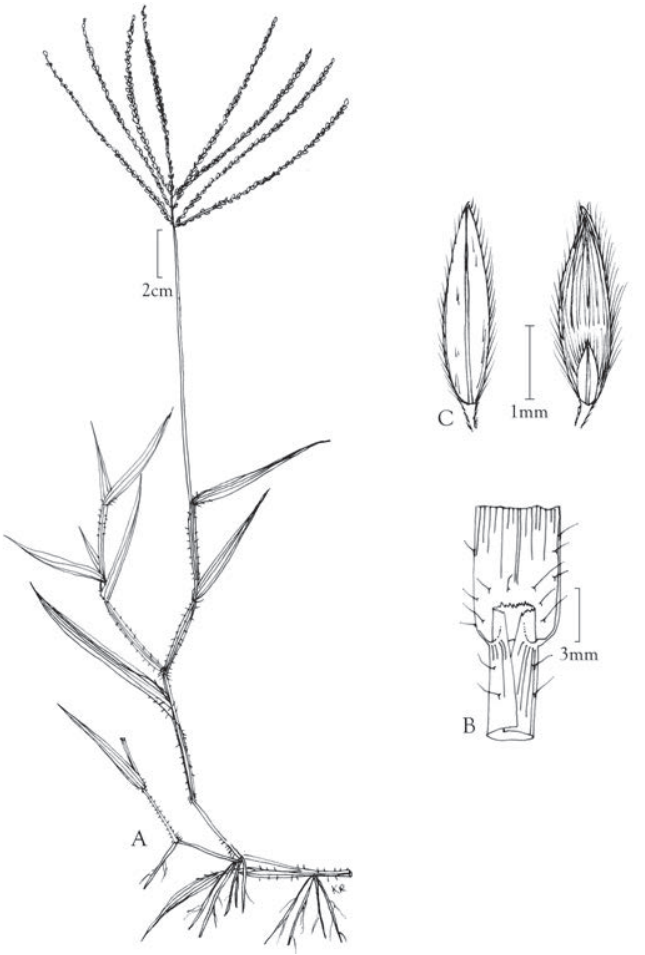


FIGURE 70. *Digitaria ciliaris.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower (left) and upper (right) glumes. A drawn from *S. Soliman s.n.* (CAI); B, C drawn from *S. Laegaard & S. Traore s.n.* (US-3595166).

long, in pairs, elliptic, dorsally compressed, sharply acute; lemmas awnless. Distribution: tropics, worldwide.

62. *Digitaria debilis* (Desf.) Willd.

FIGURE 71

Digitaria debilis (Desf.) Willd., Enum. Pl. 91. 1809.
Common names: *musa ladel, narkata*; finger grass.

Straggling annuals. Culms 20–60 cm high, geniculately ascending from a prostrate base; branching ample from lower nodes; internodes glabrous, striate; nodes glabrous; butt sheaths hairy. Leaves basal and cauline; sheaths pubescent, striate; ligules up to 2 mm long, eciliate membrane, apex truncate; blades 3–13 cm long, 0.2–0.6 cm wide, flat, flaccid, hairy, with fine white midribs about ⅓ of their length, margins scabrid or pubescent, bases subcordate tapering to a fine point. Inflorescences 7–20 cm long, with 3–17 racemes 3–16 cm long, subdigitately borne on a short, central rachis. Spikelets (2–)2.4–3.6(–4.5) mm long, paired on a triquetrous rachis, lanceolate; lemmas awnless. Distribution: southern Europe, tropical Africa, and western Indian Ocean.

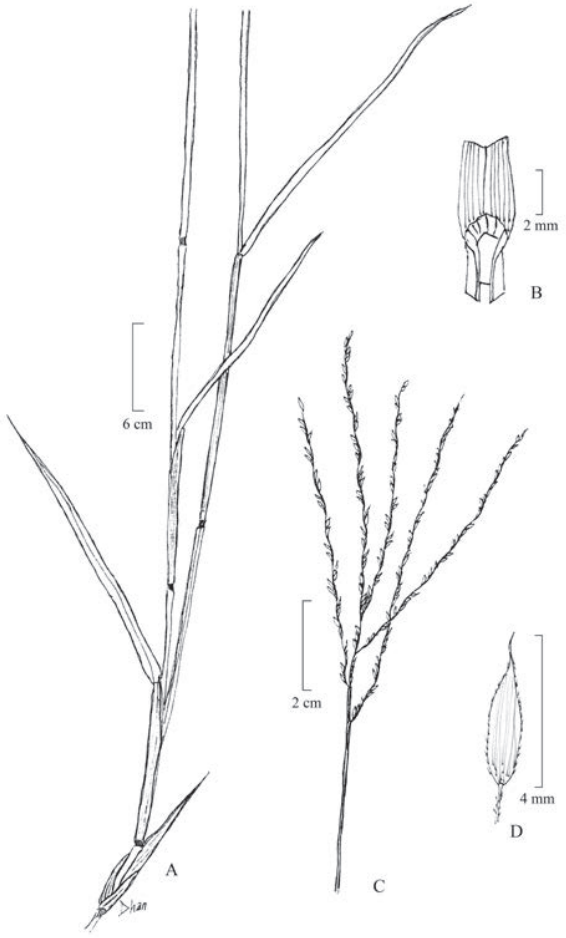


FIGURE 71. *Digitaria debilis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *S. Laegaard 16218* (US-3298995).

63. *Digitaria delicata* Goetgh.

FIGURE 72

Digitaria delicata Goetgh., Bull. Jard. Bot. Natl. Belg. 45: 398. 1975.

Caespitose annuals. Culms 20–30 cm long; erect, or geniculately ascending; branching sparse; internodes glabrous; nodes glabrous. Leaves basal and cauline; sheaths glabrous; ligules 1–1.5 mm long, ciliolate membrane, apex truncate; blades 3–10 cm long, 0.2–0.4 cm wide, linear, flat or convolute, midribs conspicuous, scaberulous or sparingly hairy on basal ⅓; margins

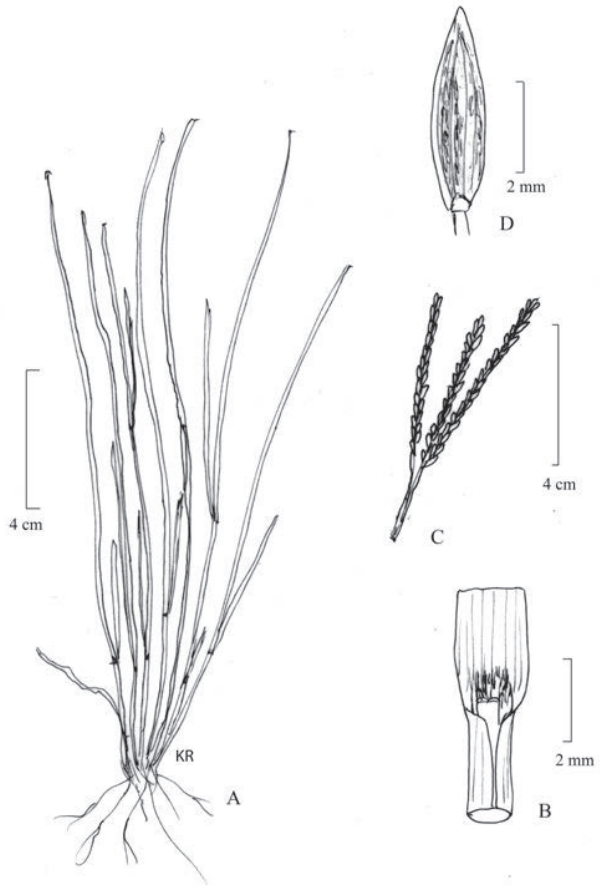


FIGURE 72. *Digitaria delicata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *R. A. Farrow 81* (K).

cartilaginous, scaberulous, apex attenuate. Inflorescence composed of 2–3 racemes, digitate, unilateral; racemes 3–6 cm long, rachis narrowly winged, angular. Spikelets 2–2.2 mm long, in threes, elliptic, dorsally compressed, falling entire; lemmas awnless. Distribution: tropical West Africa.

64. *Digitaria delicatula* Stapf

FIGURE 73

Digitaria delicatula Stapf, Fl. Trop. Afr. 9: 454. 1919.

Caespitose or solitary annuals. Culms up to 60 cm high, erect or slighty geniculate, slender; braching ample arising from near the base; internodes very smooth, shining, glabrous; nodes bearded. Leaves mostly cauline; sheaths somewhat loose, the lower ones often slipping off the internodes, coarsely striate, glabrous but basal ones usually conspicuously hairy; nodes bearded; oral hairs bearded; ligules ciliolate membrane; blades 10–20 cm long, 0.1–0.2 cm wide, flaccid, narrowly linear, flat or convolute, scabrous or sparingly hirsute, with a fine white midrib visible for ⅓ their length, margins scabrous, apex attenuate. Inflorescence composed of 2–3, rarely 4, digitately arranged racemes on a very slender subangular rachis; racemes 10–15 cm long. Spikelets up to 2 mm long, appressed; lemma awnless. Distribution: tropical West Africa.

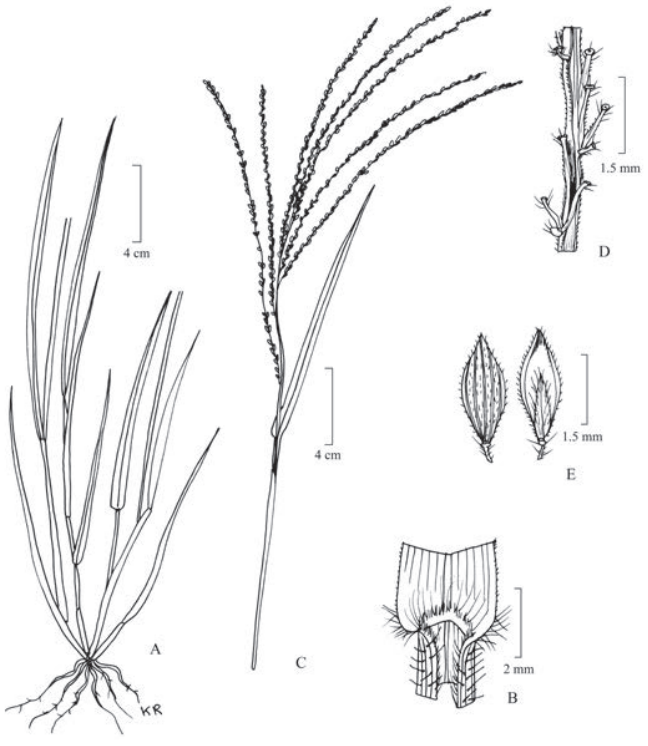


FIGURE 73. *Digitaria delicatula.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Part of inflorescence. E. Spikelets. A–E drawn from *C. F. Charter s.n.* (US-2209017).

65. *Digitaria exilis* (Kippist) Stapf

FIGURE 74

Digitaria exilis (Kippist) Stapf, Bull. Misc. Inform. Kew 1915: 385. 1915.

Common names: *fani, tau*; black fonio, hungry millet, white acha.

Annuals. Culms over 45 cm tall, erect or geniculate-ascending; branching simple or sparingly branched from below. Leaves basal and cauline; sheaths firm below and somewhat loose and slipping off above; internodes glabrous, smooth, striate; lower sheaths more or less keeled; ligules eciliate membrane; blades 5–15 cm long, 0.3– 0.6 cm wide, linear, flat or convolute, scabrous or slightly hairy, gradually tapering to an acute point.

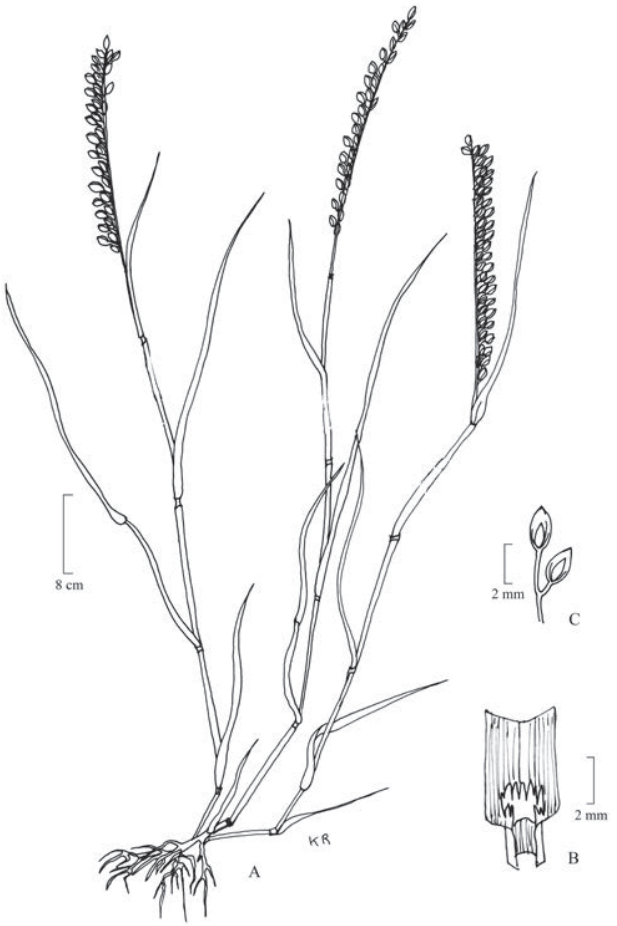


FIGURE 74. *Digitaria exilis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *Kersting 193* (US-1063858).

Racemes 2–4, sessile, digitate, suberect or erect, very slender; racemes 4–10 cm long. Spikelets 1.5–2 mm long, elliptic-oblong, acute; lemmas awnless. Distribution: tropical West Africa.

66. *Digitaria fragilis* (Steud.) Luces

FIGURE 75

Digitaria fragilis (Steud.) Luces, J. Wash. Acad. Sci. 32(6): 160. 1942. [*Digitaria argillacea* (Hitchc. and Chase) Fernald]

Caespitose annuals. Culms 30–60 cm high, erect; internodes glabrous; nodes bearded. Leaves mostly basal; sheaths covered with short hairs; ligules ciliolate membrane; blades 15–25 cm long, 3–4 mm wide; flaccid, glabrous to hairy, margins scaberulous, bases barely rounded, apex acuminate. Inflorescence composed of 2–4 racemes, digitate, paired; racemes 10–15 cm long, erect, flexuous, unilateral. Spikelets in threes; fertile spikelets 1.8–2 mm long, oblong, dorsally compressed; lemmas awnless. Distribution: tropical West Africa, North America, Mexico, and South America.

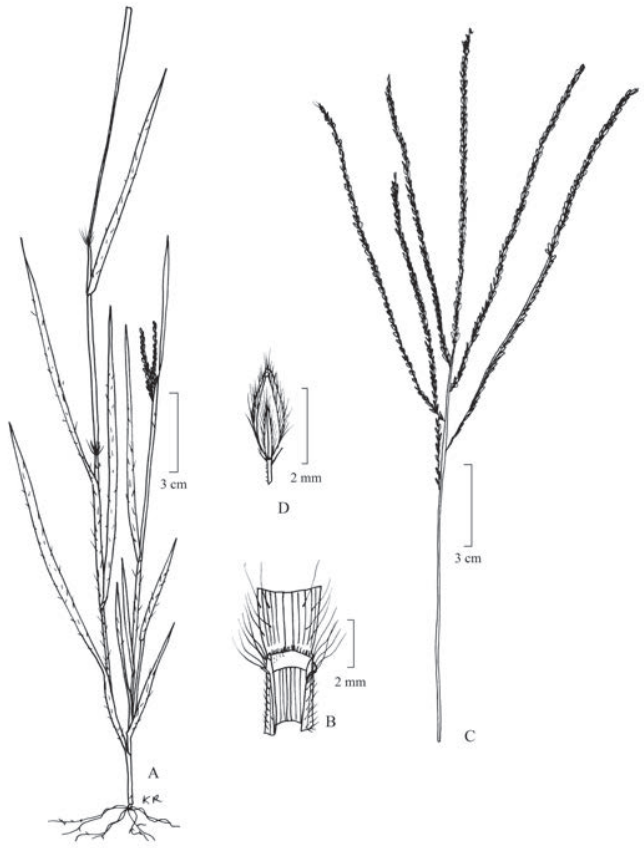


FIGURE 75. *Digitaria fragilis*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *E. L. Ekman 7700* (US-1297599).

67. *Digitaria gayana* (Kunth) Stapf ex Chev.

FIGURE 76

Digitaria gayana (Kunth) Stapf ex Chev., Sudania 1: 163. 1911. Common names: *debbo daneya, gague*.

Loosely caespitose or solitary annual. Culms 30–60 cm high, erect, slender; yellowish, occasionally branching at base; internodes glabrous. Leaves basal and cauline; sheaths firm, the lower ones longer than the internodes, striate, short hirsute; ligule an eciliate membrane, collar whitened; blades 3–15 cm long, 2–8 mm wide, broadly linear, flat, scaberulous, margins scaberulous, sometimes with scattered bulbous-based bristles, bases slightly rounded, apex acute. Inflorescence of (1–)2–6 digitate racemes; racemes 3–18 cm long. Spikelets 2–3 mm long, narrowly

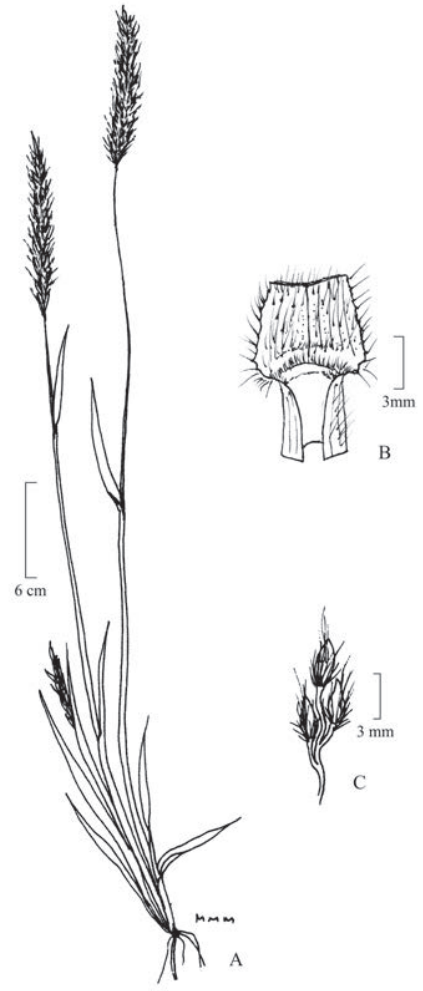


FIGURE 76. *Digitaria gayana*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

ovate, in clusters of 3 or 4 on a sharply triquetrous winged rachis; lemmas awnless. Distribution: tropical Africa.

68. *Digitaria leptorachis* (Pilg.) Stapf

FIGURE 77

Digitaria leptorachis (Pilg.) Stapf, Fl. Trop. Afr. 9: 462. 1919.

Annuals, or short-lived perennials. Culms 30–100 cm high, wiry, ascending from a decumbent base, rooting at the lower nodes, branching from the lower nodes; internodes glabrous, glossy; nodes villous, rarely glabrous. Leaves basal and cauline; sheaths glabrous, smooth, striate, keeled; ligules eciliate membrane; blades 5–20 cm long, 2–6 mm wide, narrowly linear, pubescent or rarely glabrous, distinct white midrib visible ⅓ their length, bases slightly narrowed, apex attenuate. Inflorescence of 5–12(–17) racemes; racemes 4–11 cm long, subdigitate or arranged on a common axis up to 10 cm long. Spikelets 1.4–2 mm long, paired on a slender triquetrous rachis; lemmas awnless. Distribution: tropical Africa.

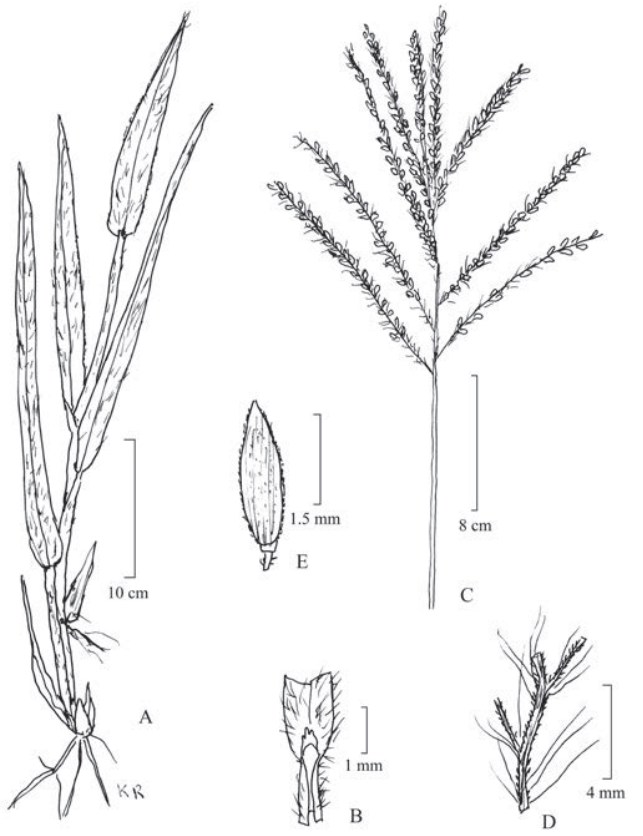


FIGURE 77. *Digitaria leptorachis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Part of inflorescence. E. Spikelet. A–E drawn from *C. Walters & R. Niangadona 1098* (US-3526978).

69. *Digitaria longiflora* (Retz.) Pers.

FIGURE 78

Digitaria longiflora (Retz.) Pers., Syn. Pl. 1: 85. 1805.
Common names: *saana voonu ana*; false couch finger grass, Indian crab grass.

Mat-forming annuals or short-lived perennials; sometimes with short slender stolons. Culms 10–60 cm high, erect, decumbent or prostrate; internodes glabrous; nodes dark, rooting at the nodes; branching sparse, arising from lower culms; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, usually glabrous but occasionally hirsute, compressed and keeled; ligules 1–1.5 mm long, eciliate membrane; blades 5–10(15) cm long, 2–6 mm wide, broadly linear to narrowly lanceolate, flat or

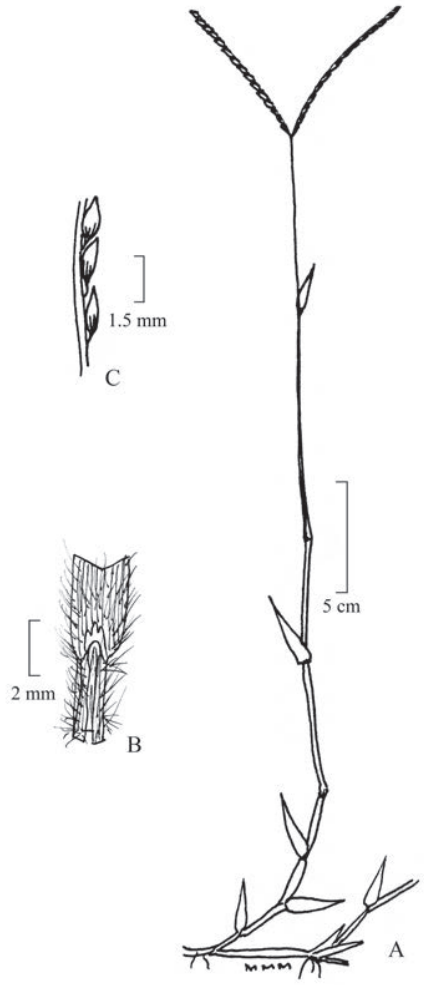


FIGURE 78. *Digitaria longiflora*. A. Culm. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from *A. J. Oakes 1237* (US-3012003).

involute, glabrous to sparsely hirsute, ribbed, margins smooth, bases barely rounded, apex acute. Inflorescence of (1)2–4 digitate racemes; racemes 1–10 cm long. Spikelets 1.5–2.0 mm long, elliptic, in threes on a ribbonlike winged rachis; lemma awnless. Distribution: throughout the Eastern Hemisphere tropics; introduced to the Western Hemisphere.

70. *Digitaria nuda* Schumach.

FIGURE 79

Digitaria nuda Schumach., Beskr. Guin. Pl. 45. 1827.
Common names: hairy crab grass, naked crab grass, wild findi.

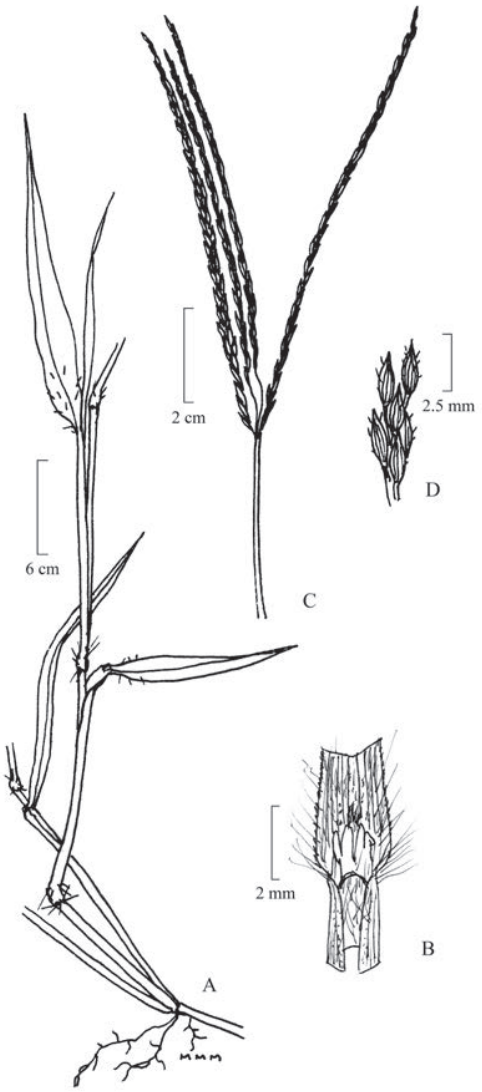


FIGURE 79. *Digitaria nuda.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

Annuals, sometimes mat forming. Culms 15–100 cm high, slender, creeping or decumbent; stolons present; branching sparse, arising from lower culms, internodes glabrous; nodes dark and subglabrous. Leaves mostly cauline; sheaths scaberulous, sometimes loosely hairy, longer than leaf blades; ligules 1–2 mm long, eciliate membrane, truncate, erose; leaf blades 5–20 cm long, 0.3–1 cm wide, linear to linear-lanceolate, flat, scaberulous, margins scaberulous, apex acuminate. Inflorescence of 2–10 digitately arranged racemes; racemes (3)7–12 cm long, in one or two whorls. Spikelets 2–2.8 mm long, in pairs, oblong to lanceolate; lemmas awnless. Distribution: tropical Africa, tropical Asia, and South America.

71. *Digitaria ternata* (A. Rich.) Stapf

FIGURE 80

Digitaria ternata (A. Rich.) Stapf, Fl. Cap. 7: 376. 1898.
Common names: black-seed crab grass, black-seed finger grass.

Caespitose annuals. Culms 20–100 cm high, geniculately ascending; branching sparse, arising from lower culms; internodes glabrous or sparsely hairy; nodes dark and glabrous; butt sheaths glabrous or sparsely hairy. Leaves basal and cauline; sheaths glabrous to sparsely hairy; oral hairs present; ligules short, membranous, truncate; blades, 5–40 cm long, 0.3–0.8 cm wide, broadly linear, flat, flaccid glabrous or with few fine, spreading hairs especially at the base, white fine midrib ⅓ of their length, margins glabrous to slightly pubescent, bases rounded and sparsely hairy, apex acute. Inflorescence of 2–11 subdigitate arranged racemes; racemes 3–23 cm long. Spikelets 1.8–2.7 mm long, in threes on a ribbonlike winged rachis, ovate-elliptic; lemmas awnless. Distribution: temperate and tropical Africa, North America, and South America.

72. *Diheteropogon hagerupii* Hitchc.

FIGURE 81

Diheteropogon hagerupii Hitchc., Proc. Biol. Soc. Wash. 43: 89. 1930.

Caespitose or solitary annuals. Culms 100–150 cm high, erect, slender; branching sparse, arising from lower nodes; internodes glabrous. Leaves mostly cauline; leaf sheaths open, keeled, scabrous; ligules eciliate membrane, very short; blades 5–20 cm long, 0.5–2 cm wide, glaucous, linear-lanceolate, flat, scabrous, bases cordate, or amplexicaul. Inflorescences terminal and axillary, composed of racemes; racemes 2–6 cm long, 2 in number, paired. Spikelets 6–10 mm long, paired, dorsally compressed; principal lemma awns 60–110 mm long overall, arising from a sinus, bigeniculate, with twisted column, the column hirtellous with 0.5 mm long hairs. Distribution: West and west-central Africa.

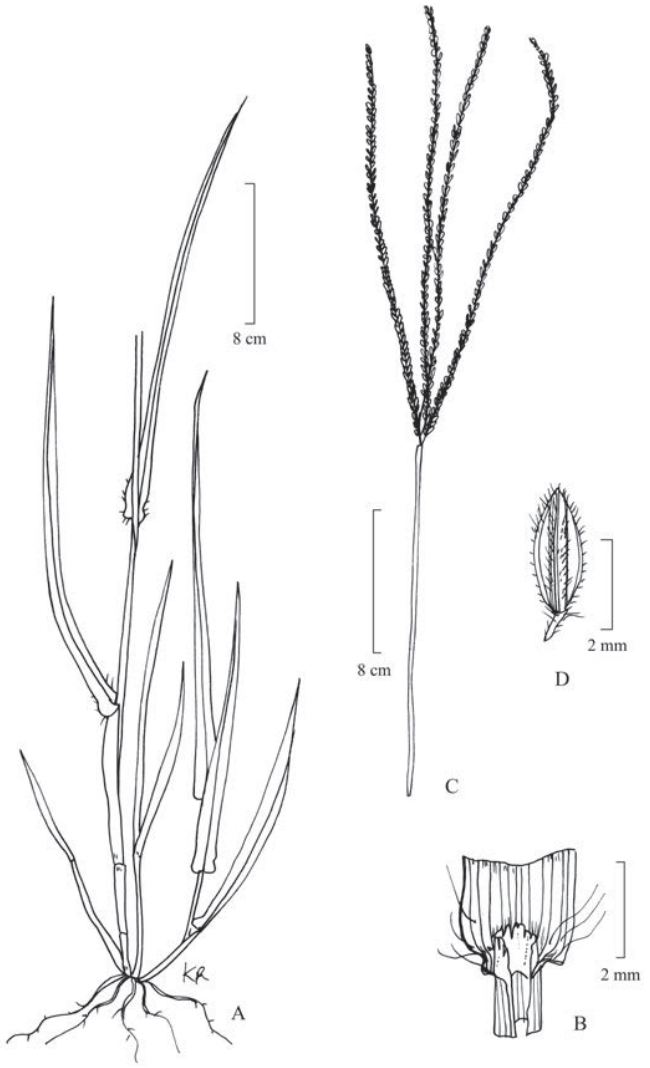


FIGURE 80. *Digitaria ternata*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *L. Smook 2828 CA* (US-3184879).



FIGURE 81. *Diheteropogon hagerupii*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *S. A. Gyadu 515* (US-2209051).

73. *Dilophotriche tristachyoides* (Trin.) Jacq.-Fél.

FIGURE 82

Dilophotriche tristachyoides (Trin.) Jacq.-Fél., J. Agric. Trop. Bot. Appl. 7: 408. 1960.

Caespitose perennials. Culms 40–120 cm long, slender, solitary, erect; branches lacking. Internodes glabrous; nodes dark. Leaves mostly cauline; sheaths longer than leaf blades, keeled, scabrous, ligules fringe of hairs; blades 5–20 cm long, 0.4–0.9 cm wide, linear to linear-lanceolate, flat or convolute, scabrous, apex attenuate. Panicles 5–12 cm long, open, oblong. Spikelets 6–12 mm long, in threes, lanceolate, laterally compressed, breaking up at maturity; lemma 3-awned, apex lobed, bifid; principal lemma awns 15–30 mm long overall, from a sinus, geniculate, flat below with twisted column, the column 5–8 mm long, lateral lemma awns arising on apex of lobes, the lobes 4–8 mm long, shorter than principal. Distribution: tropical West Africa.

74. *Dinebra coerulescens* (Steud.) P. M. Peterson & N. Snow

FIGURE 83

Dinebra coerulescens (Steud.) P. M. Peterson & N. Snow, Ann. Bot. (Oxford), n.s. 109: 1326. 2012. [*Leptochloa coerulescens* Steud.]

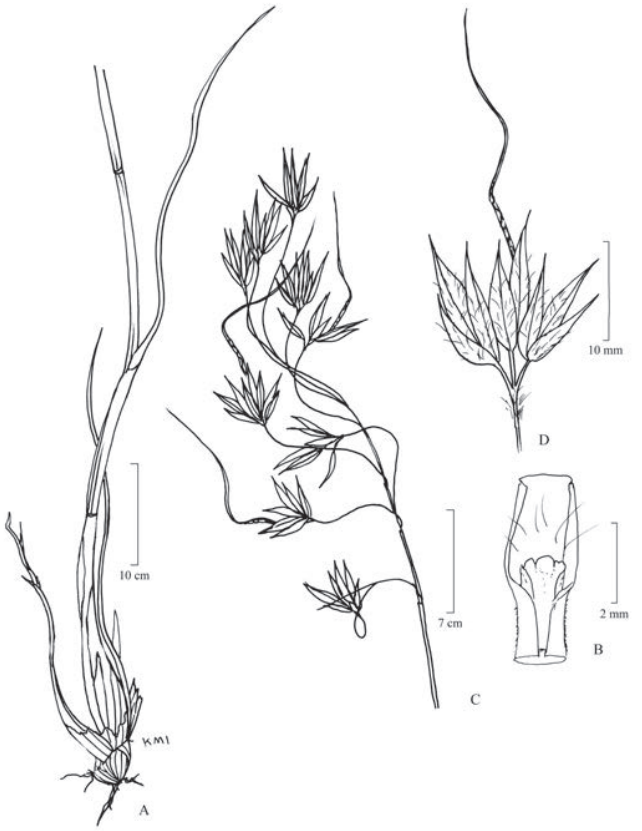


FIGURE 82. *Dilophotriche tristachyoides.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *T. S. Janesi 381* (US-2566173).

Solitary annuals. Culms 50–100 cm long, decumbent; internodes glabrous; nodes rooting below; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous; ligules 1–2 mm long, an eciliate membrane; blades 5–30 cm long, 0.1–0.8 cm wide, linear, flat or involute, glabrous with distinct white midribs for about ⅓ their length, apex attenuate. Racemes 2–8 cm long, numerous, borne along a central axis, flexuous, unilateral; lemma apex dentate, bifid, apex obtuse, awnless. Distribution: tropical Africa and western Indian Ocean.

75. Echinochloa callopus (Pilg.) Clayton

FIGURE 84

Echinochloa callopus (Pilg.) Clayton, Kew Bull. 34: 560. 1980.

Caespitose annuals. Culms 20–120 cm high, erect or geniculately ascending with a few branches arising below; internodes glabrous; nodes dark. Leaves basal and cauline; sheaths glabrous, open; ligules fringe of hairs; blades 5–30 cm long, 4–10 mm wide,

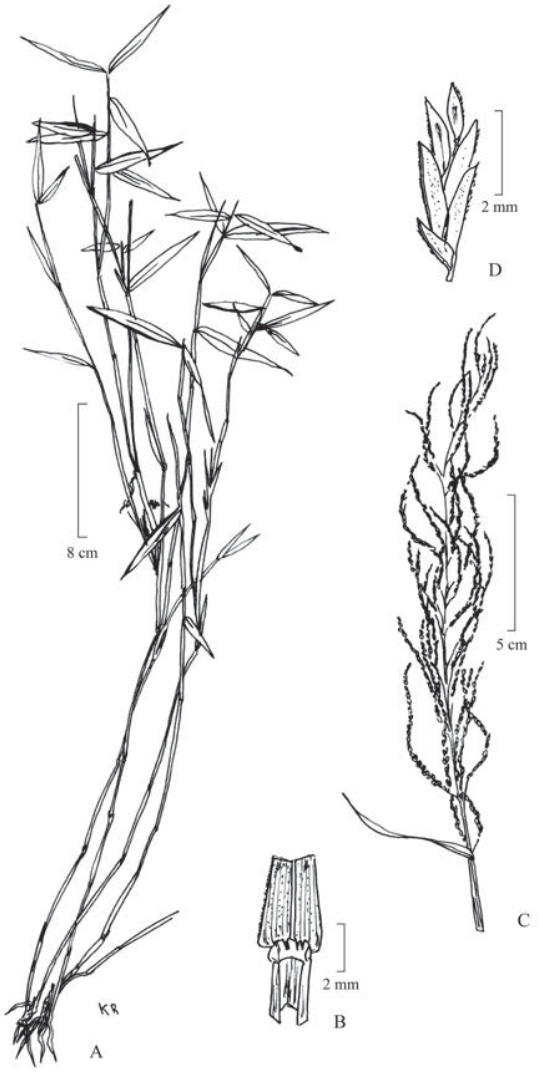


FIGURE 83. *Dinebra coerulescens.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *W. H. Brown and A. H. Brown 150* (US-230841).

linear, flat or conduplicate, glaucous, scabrous, apex acuminate. Inflorescence with numerous racemes borne along a central axis; racemes 2–20 cm long, spreading, oblong to linear. Spikelets 3–4 mm long, ovate-elliptic, borne singly in 2 rows, appressed or spreading; lemmas awnless. Distribution: tropical Africa.

76. Echinochloa colona (L.) Link

FIGURE 85

Echinochloa colona (L.) Link, Hort. Berol. 2: 209. 1833.
Common names: *aseral, hudo belle*; jungle rice grass, Kalahari water grass.

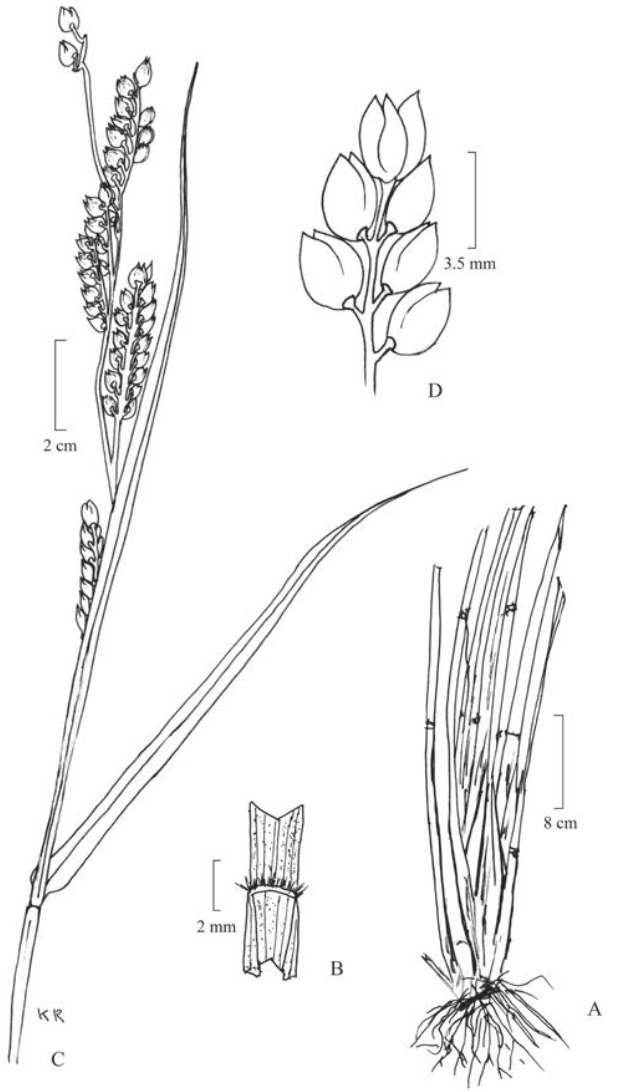


FIGURE 84. *Echinochloa callopus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. Laegaard* with *Sobere Traore 17817* (US-3591423).

Caespitose annuals. Culms 15–100 cm tall, decumbent; internodes glabrous; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths flattened, glabrous, margins smooth; ligules absent; blades 3–30 cm long, 2–6 mm wide, linear, flat, ascending, glaucous, scabrous, with midrib protruding below, margins smooth, bases broadly rounded, apex acuminate. Racemes 0.5–3 cm long, borne along a central axis, ascending (rarely) or appressed. Spikelets 1.5–3 mm long, in pairs, ovate or orbicular, dorsally compressed, gibbous, apex acute or cuspidate; lemmas awnless. Distribution: tropics and subtropics.

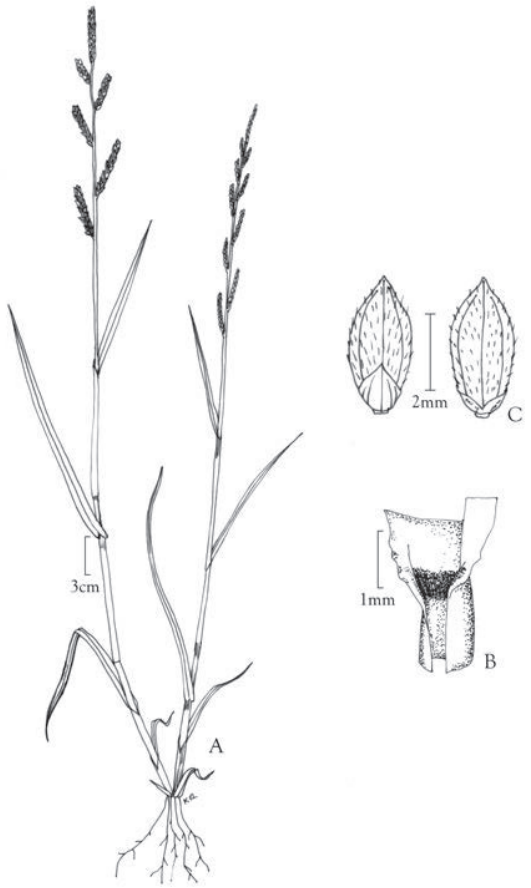


FIGURE 85. *Echinochloa colona.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with upper (right) and lower (left) glumes. A drawn from *N. El Hadidi s.n.* (CAI); B drawn from *W. Burger 2167* (US-2465212); C modified from Michael (2003).

77. Echinochloa pyramidalis (Lam.) Hitchc. & Chase

FIGURE 86

Echinochloa pyramidalis (Lam.) Hitchc. & Chase, Contr. U.S. Natl. Herb. 18: 345. 1917.

Common names: *farka teli, fingui*; antelope grass, Limpopo grass.

Solitary reedlike perennials; rhizomes elongated. Culms up to 400 cm tall, bamboolike, erect, robust firm; internodes glabrous, striate; nodes glabrous, lower nodes rooting; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths glabrous, glaucous, ribbed, margins membranous; auricles clawlike; oral hairs present; ligules 1 mm long, fringe of hairs; blades 5–50 cm long, 2–20 mm wide, linear, flat, spreading, scabrous, with a well-defined white midrib on lower ½, margins cartilaginous, base broadly rounded,



FIGURE 86. *Echinochloa pyramidalis.* A. Lower culm. B. Leaves. C. Ligule, sheath, and blade. D. Inflorescence. E. Spikelet. A, B, D modified from Ibrahim and Kabuye (1988); C drawn from *K. Addei 592* (US-2209083); E modified from Michael (2003).

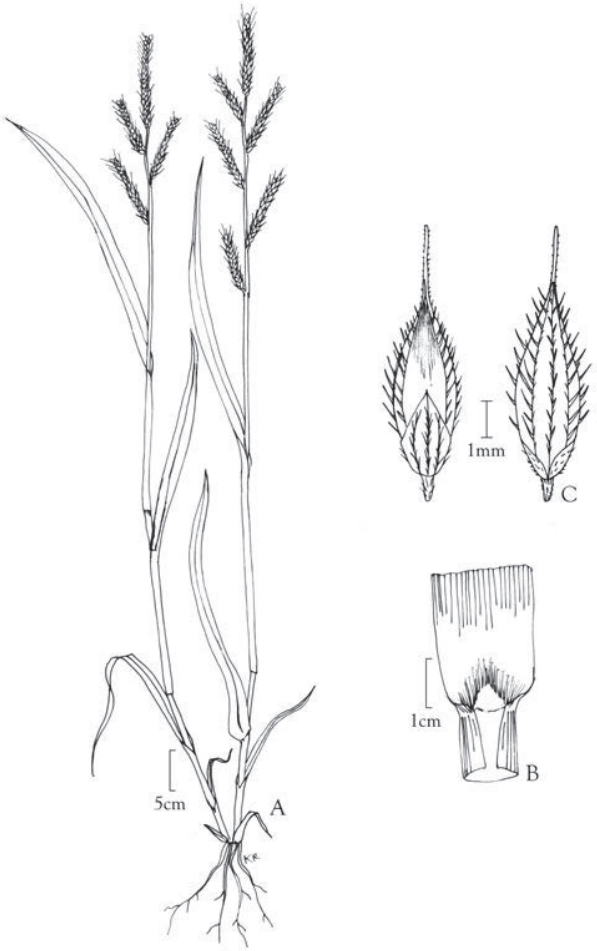


FIGURE 87. *Echinochloa stagnina.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with upper (right) and lower (left) glumes. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *A. Pappi s.n.* (US-1984300).

apex attenuate. Racemes 3–20 cm long, borne along a central axis, overlapping, ascending. Spikelets 2.5–3.5(–4) mm long, in pairs, elliptic or ovate, dorsally compressed, apex acute; lemmas usually unawned, sometimes mucronate or with awns 2–3 mm long. Distribution: tropical southern Africa and Arabia.

78. *Echinochloa stagnina* (Retz.) P. Beauv.

FIGURE 87

Echinochloa stagnina (Retz.) P. Beauv., Ess. Agrostogr. 53, 161, 171. 1812.
Common names: *aluala, birbou*; burgugrass, hippo grass.

Solitary perennials, sometimes behaving as annuals; rhizomes elongated. Culms up to 200 cm tall, spongy, decumbent; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; auricles clawlike; oral hairs present; ligules fringe of hairs; blades 10–40 cm long, 2–10 mm wide, linear, flat, spreading, flaccid, glaucous with a fine white midrib, scabrous, margins scabrid, base broadly rounded, apex acuminate. Racemes 2–8 cm long, borne along a central axis, overlapping, flexuous. Spikelets 3.5–6 mm long, in pairs, elliptic, dorsally compressed, apex acuminate; principal lemma awns 3–20(–50) mm long. Distribution: tropical Africa to India.

79. *Eleusine africana* Kenn.-O'Byrne

FIGURE 88

Eleusine africana Kenn.-O'Byrne, Kew Bull. 12: 65. 1957.
Common name: wild African finger millet.

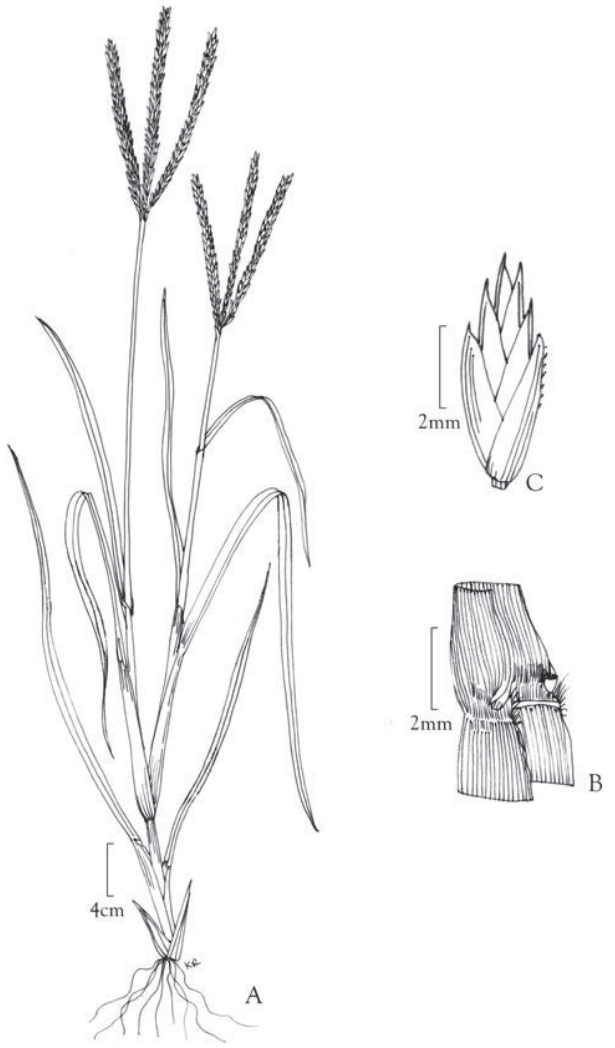


FIGURE 88. *Eleusine africana.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 6513* (CAI); B, C drawn from *J. Medley Wood 5996* (US-362820).

Caespitose annuals. Culms 20–90 cm tall, erect, straight, moderately robust; internodes glabrous; nodes dark, often lower nodes rooting; butt sheaths scarious or glabrous. Leaves mostly basal; sheaths keeled, open, glabrous, ribbed, margins membranous; oral hairs present; ligules 1–3 mm long, ciliate membrane; blades 10–60 cm long, 5–10 mm wide, flat or conduplicate, flaccid, pilose, margins ciliate, bases narrow, apex acuminate. Inflorescence with 3–15 digitately borne racemes; racemes 4–17 cm long, 4–8 mm wide, unilateral. Spikelets 4–8 mm long, 3–9-flowered, elliptic, laterally compressed; lemmas 3.7–5 mm long, awnless. Caryopsis oblong. Habitat: disturbed sites, roadsides, and a common weed of cultivation. Distribution: southern and East Africa.

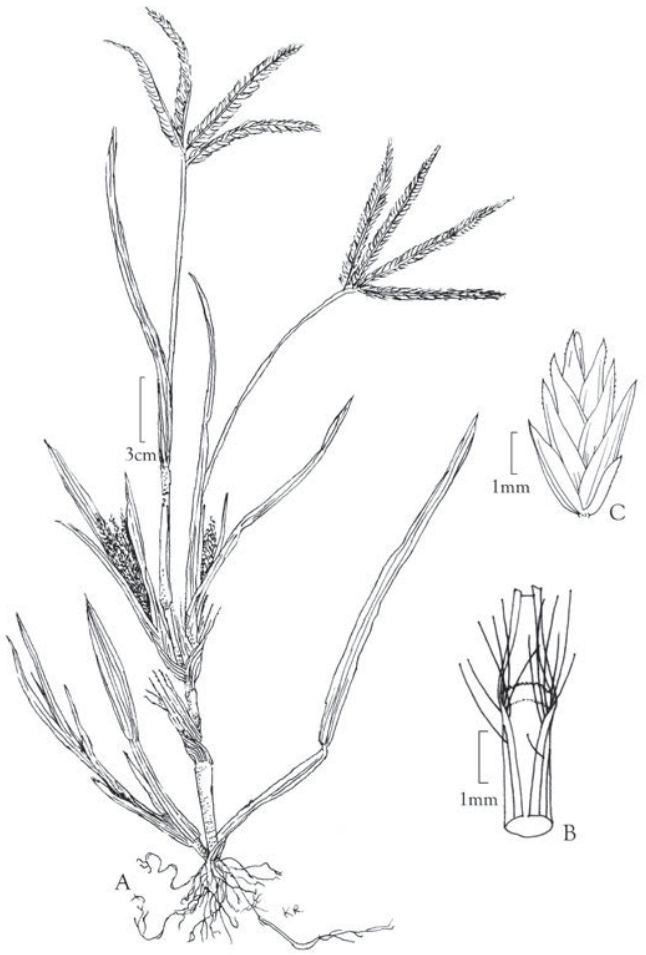


FIGURE 89. *Eleusine indica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *E. C. Leonard 19514* (US-1866464); *R. Kanal 177* (US-3117706); C modified from Hilu (2003).

80. *Eleusine indica* (L.) Gaertn.

FIGURE 89

Eleusine indica (L.) Gaertn., Fruct. Sem. Pl. 1: 8. 1788.
Common names: *gondnema, so pegou*; Indian goosegrass, yardgrass.

Caespitose annuals. Culms 10–70 cm tall, erect, geniculate, subterete, usually branching at the base; internodes elliptical in cross section, minutely ciliolate; nodes dark; butt sheaths scarious, glabrous. Leaves mostly basal; sheaths keeled, stongly compressed, open, sparsely hairy, margins sparsely hairy; oral hairs present; ligules 0.5–1 mm long, membranous, apex truncate; blades 5–30 cm long, 2–5 mm wide, linear, flat or conduplicate, ascending, sparsely hairy, margins smooth, bases narrow, apex

abruptly acute. Inflorescence with 1–10(–17) digitately borne racemes; racemes 3.5–15.5 cm long, 3–3.5 mm wide, unilateral. Spikelets 4.6–7.8 mm long, 3–9-flowered, elliptic, laterally compressed; lemmas 2.1–3.6 mm long, awnless. Caryopsis elliptic. Distribution: pantropical.

81. *Elionurus elegans* Kunth

FIGURE 90

Elionurus elegans Kunth, Révis. Gramin. 1: 161. 1829.
Common names: *kamere, kilaburu, sabi.*

Annuals. Culms 30–60 cm high, slender, erect; branching sparse from midculm or lacking, internodes glabrous; nodes bearded. Leaves mostly basal; sheaths terete; ligules very short, membranous, densely ciliate; blades 5–8(–13) cm long, 1–2.5 cm wide, linear, flat or involute, flaccid, glabrous or sparingly hairy to hirsute toward the bases. Inflorescences composed of racemes; exserted; racemes 6–10 cm long, single, straight, or arcuate. Spikelets 4 mm long, in pairs; sterile spikelets well developed, staminate, lanceolate or ovate, dorsally compressed, shorter than fertile, deciduous with the fertile; lemmas awnless. Distribution: tropical Africa.

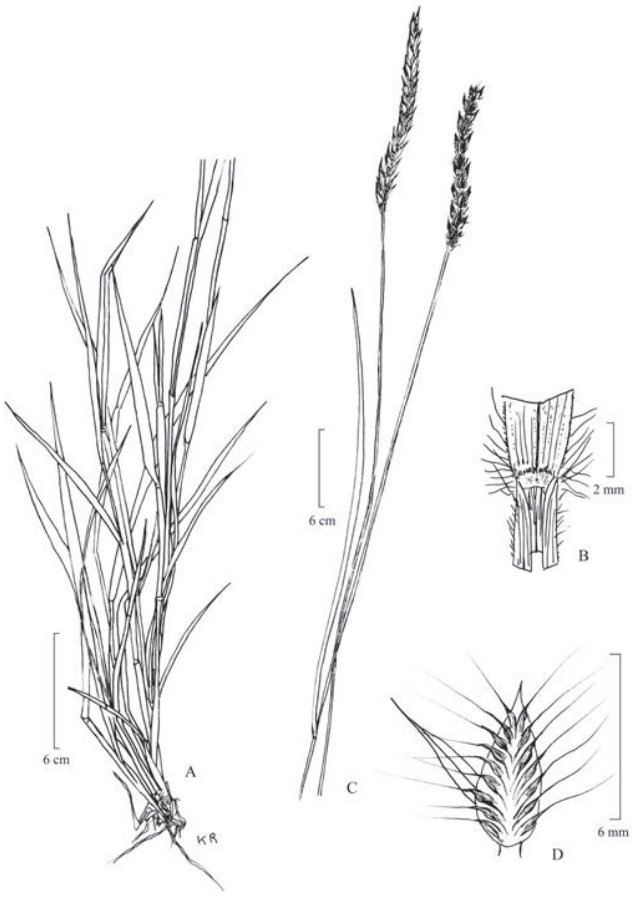


FIGURE 90. *Elionurus elegans*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *G. A. Mensah 487* (US-2209032).

82. *Elymandra androphila* (Stapf) Stapf

FIGURE 91

Elymandra androphila (Stapf) Stapf, Fl. Trop. Afr. 9: 408. 1919.

Caespitose perennials. Culms 100–250 cm long, erect, terete, rather slender; branching sparse, arising from the upper culms; internodes glabrous; nodes glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous; oral hairs bearded; ligules

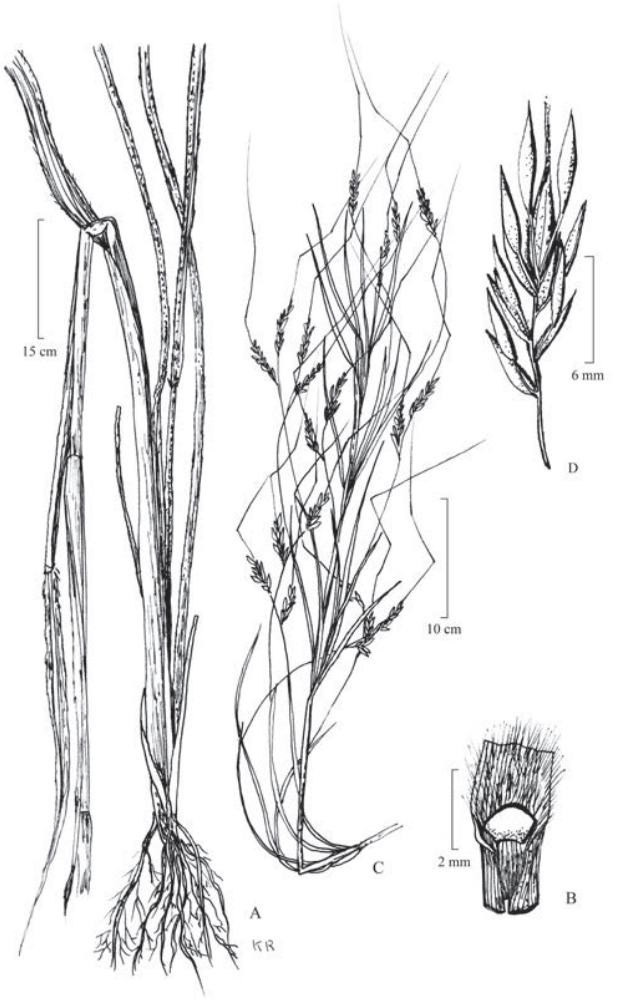


FIGURE 91. *Elymandra androphila*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Part of inflorescence. A–D drawn from *G. A. Mensah 626* (US-2209108).

1–2 mm long, ciliolate membrane, hyaline, pale brown, truncate; blades 30–60 cm long, 0.4–0.9 cm wide, narrowly linear, flat or revolute with wide bases, glaucous, scabrous with conspicuous white-hyaline midribs, margins scabrous, apex attenuate. Inflorescence with 2 racemes, paired; racemes 2–3 cm long, bearing few fertile spikelets, subtended by a spatheole; spatheoles 5–10 cm long, linear, scarious, glabrous. Spikelets 6–8 mm long, paired; lemmas awnless. Distribution: tropical Africa.

83. *Elytrophorus spicatus* (Willd.) A. Camus

FIGURE 92

Elytrophorus spicatus (Willd.) A. Camus, Fl. Indo-Chine. 7: 547. 1923.
Common name: spike grass.

Caespitose annuals. Culms 5–60 cm long, erect; branching sparse, arising from lower culms. Internodes glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths loose, glabrous; ligules eciliate membrane; blades 5–25 cm long, 0.2–0.4 cm wide, linear, flat, or partially folded, glabrous with truncate bases and attenuate apex. Panicles 2–30 cm long, (0.3–)0.5–0.7 cm wide, glomerate, linear, continuous, or interrupted. Spikelets 2–3.5 mm long in clusters, subtended by an involucre composed of imperfect spikelets; lemma apex acuminate, 1-awned, principal lemma awns 1 mm long, straight, bristle like. Distribution: tropical Africa and temperate Asia.

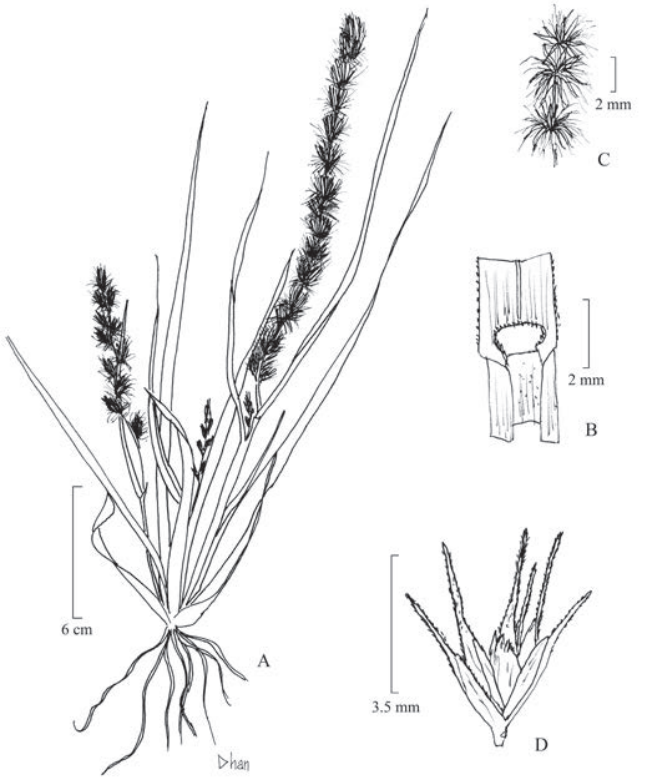


FIGURE 92. *Elytrophorus spicatus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *S. Laegaard 21307* (US-3432592).

84. *Enneapogon persicus* Boiss.

FIGURE 93

Enneapogon persicus Boiss., Diagn. Pl. Orient. ser. 1, 5: 71. 1844.

Caespitose perennials. Culms 10–60 cm tall, erect, geniculate, wiry; internodes glabrous; butt sheaths persistent, pubescent. Leaves basal and cauline; sheaths longer than blades, flattened, glabrous, ribbed, margins membranous; ligules fringe of hairs; blades 3–15 cm long, 2–3 mm wide, filiform, convolute,

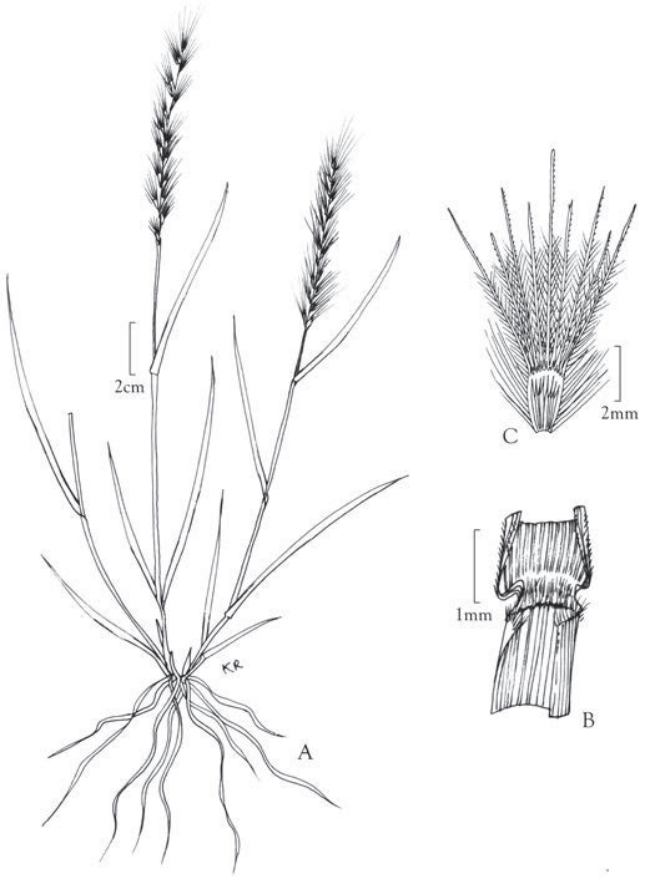


FIGURE 93. *Enneapogon persicus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran 248* (CAI); B, C drawn from *M. Nath* (US-2044576); *H. S. Gentry 12737* (US-2153633).

ascending, stiff, pilose with capitate hairs, margins scabrous, bases narrow; apex accuminte, spiny, pungent. Panicles 3–10 cm long, 1.5–2 cm wide, loosely contracted to spiciform, linear or lanceolate. Spikelets 5.5–11.5 mm long, 4-flowered, oblong, laterally compressed; lemmas 1.2–5 mm long, 9-awned, awns 4–7 mm long, straight, bristly, ciliate below. Distribution: tropical Africa, southwestern Asia to India.

85. *Eragrostis aegyptiaca* (Willd.) Delile

FIGURE 94

Eragrostis aegyptiaca (Willd.) Delile, Descr. Égypte, Hist. Nat. 157, t. 4, f. 2. 1813.

Caespitose annuals. Culms 1–46(–60) cm tall, erect to decumbent and prostrate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blade, open, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 8–25 cm long, 1–3 mm wide, linear, flat or involute, ascending or spreading, glabrous, margins scabrous, apex acuminate. Panicles 3–20 cm long, linear or lanceolate, open to somewhat contracted, embraced at base by subtending leaves; primary branches appressed or ascending, whorled at the lower nodes. Spikelets 3.5–15 mm long, 9–20-flowered, linear or oblong, laterally compressed; lemmas 1.5–1.8 mm long, awnless. Distribution: Senegal, Mali, northern Nigeria, Chad, Egypt, and Sudan.

86. *Eragrostis aspera* (Jacq.) Nees

FIGURE 95

Eragrostis aspera (Jacq.) Nees, Fl. Afr. Austral. Ill. 408. 1841. Common name: rough lovegrass.

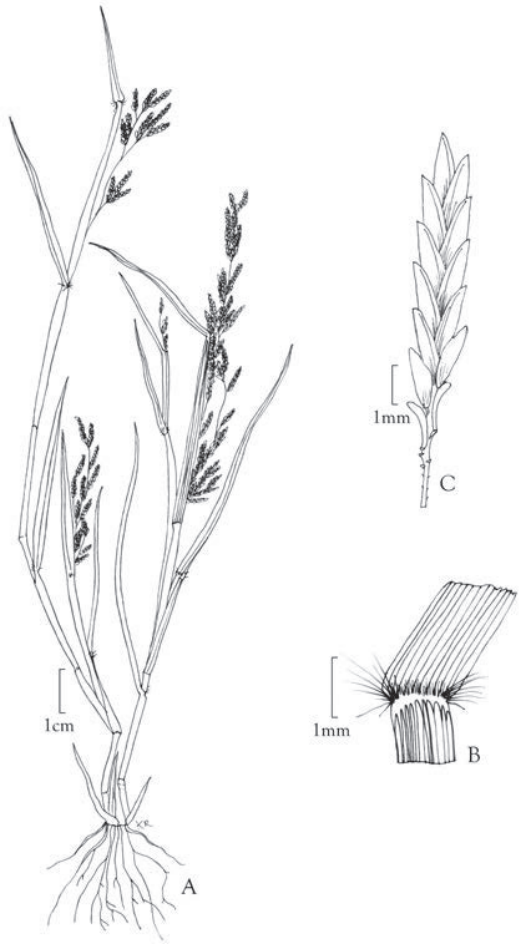


FIGURE 94. *Eragrostis aegyptiaca.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 12617* (CAI); B. C drawn from *S. Laegaard 21316* (US-3432588).

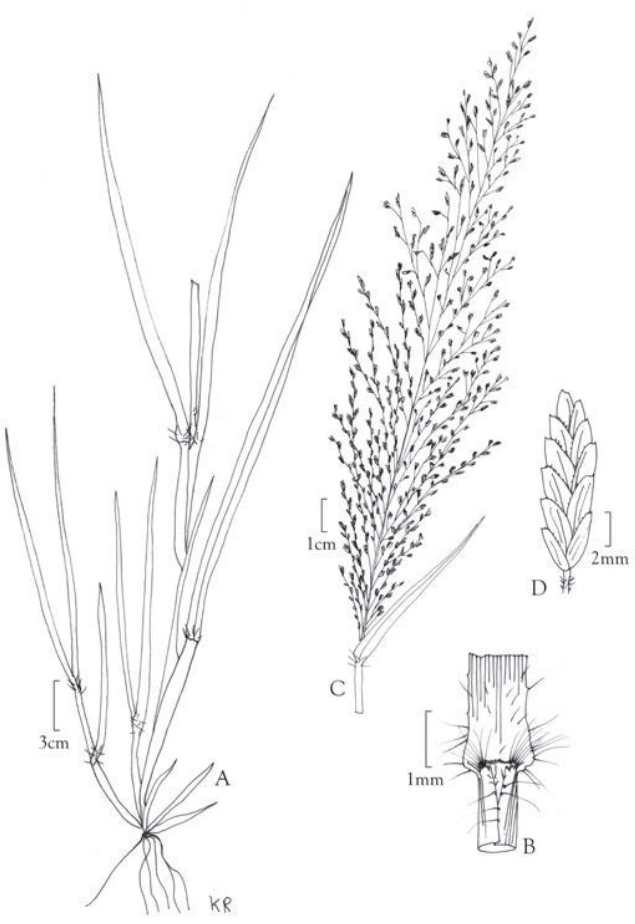


FIGURE 95. *Eragrostis aspera.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from *A. J. Salubeni 449* (US-2604689).

Caespitose annuals. Culms 20–70 cm tall, erect, rough, semiterete in cross section; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline, glaucous; sheaths glabrous, margins smooth; ligules 1–2 mm long, ciliate membrane; blades 8–30 cm long, 3–10 mm wide, linear, flat or involute, flaccid, spreading, glabrous, with white midrib recessed above and protruding on lower ⅓, margins smooth, apex acuminate. Panicles 15–40 cm long, open, elliptic or ovate, diffuse; primary branches ascending, spreading. Spikelets 3–10 mm long, 1–1.5 mm wide, 5–20-flowered, linear, laterally compressed; lemmas 1.1–1.5 mm long, awnless. Habitat: sandy and moist soils. Distribution: tropical southern Africa to India.

87. *Eragrostis atrovirens* (Desf.) Trin. ex Steud.

FIGURE 96

Eragrostis atrovirens (Desf.) Trin. ex Steud., Nomencl. Bot., ed. 2, 1: 562. 1840.
Common names: *ngwose*; Thalia lovegrass.

Caespitose perennials. Culms 30–100 cm long, geniculately ascending; branching sparse, arising from the lower culms, internodes glabrous, semiterete, striate; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths keeled, glabrous; ligules ciliate membrane; blades 15–30 cm long, 0.2–0.4 mm wide, linear, flat or involute, glabrous or ciliate below, margins glabrous, apex attenuate. Panicles 4–40 cm long, open, oblong, or ovate, contracted about primary branches. Spikelets 3–20 mm long, solitary, oblong, laterally compressed; lemmas awnless. Distribution: tropical Africa, temperate and tropical Asia, Australia, North and South America.

88. *Eragrostis barteri* C. E. Hubb.

FIGURE 97

Eragrostis barteri C. E. Hubb., Fl. W. Trop. Afr. 2: 516. 1936.

Caespitose perennials. Culms 80–100 cm long, geniculately ascending, woody, eventually collapsing and rooting from upper nodes; branching sparse, arising from midculm; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous; ligules ciliate membrane; blades 3–20 cm long, 1–3 mm wide, linear, flat, glabrous, glaucous, apex acuminate. Panicles 4–20 cm long, ovate. Spikelets 8–16 mm long, solitary, oblong, laterally compressed; lemmas awnless. Distribution: tropical Africa.

89. *Eragrostis cilianensis* (All.) Vignolo ex Janch.

FIGURE 98

Eragrostis cilianensis (All.) Vignolo ex Janch., Mitt. Naturwiss. Vereins Univ. Wien, n.s. 5(9): 110. 1907.
Common names: *fitirde, samba gambi*; gray lovegrass, stink grass.

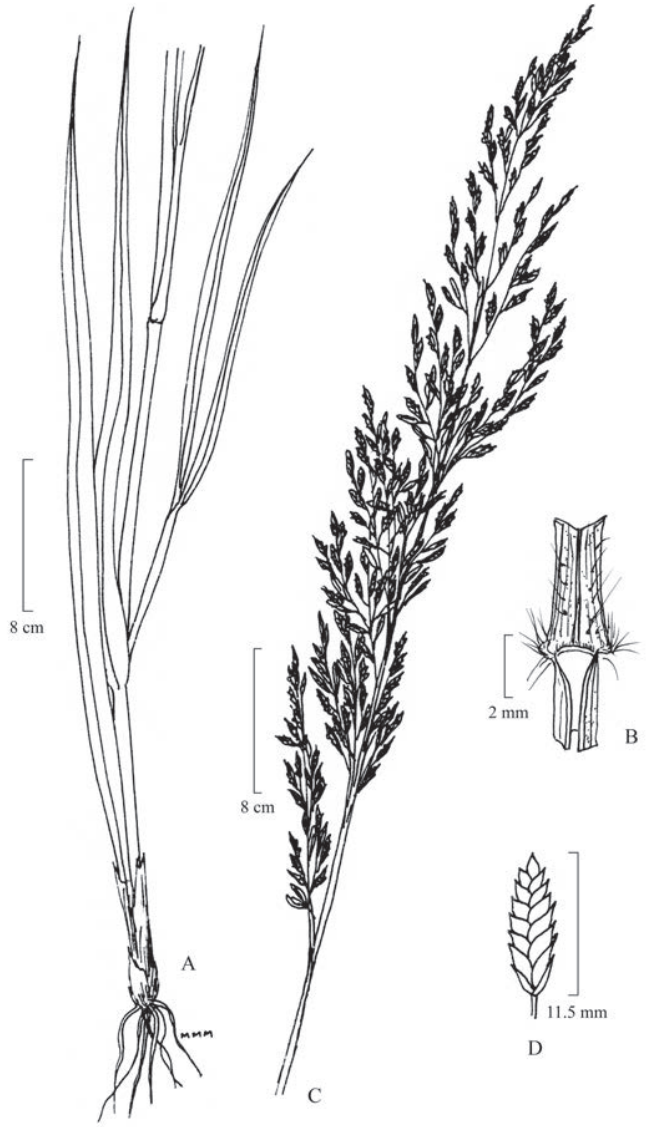


FIGURE 96. *Eragrostis atrovirens.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from from Poilecot (1999).

Caespitose annuals. Culms 10–70(–100) cm tall erect, geniculate; internodes glabrous, glossy; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, ribbed, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 3–15 cm long, 2–6 mm wide, involute, spreading, glabrous below and scabrid above, margins glandular or eglandular and scabrid, apex acuminate. Panicles 4–30 cm long, open or contracted, ovate, dense or loose. Spikelets 3–20 mm long, 2–4 mm wide, 8–30-flowered, oblong or ovate, laterally compressed; lemmas 2–2.5 mm long, keel with 1–3 crateriform glands, awnless. Distribution: tropical and warm temperate regions.

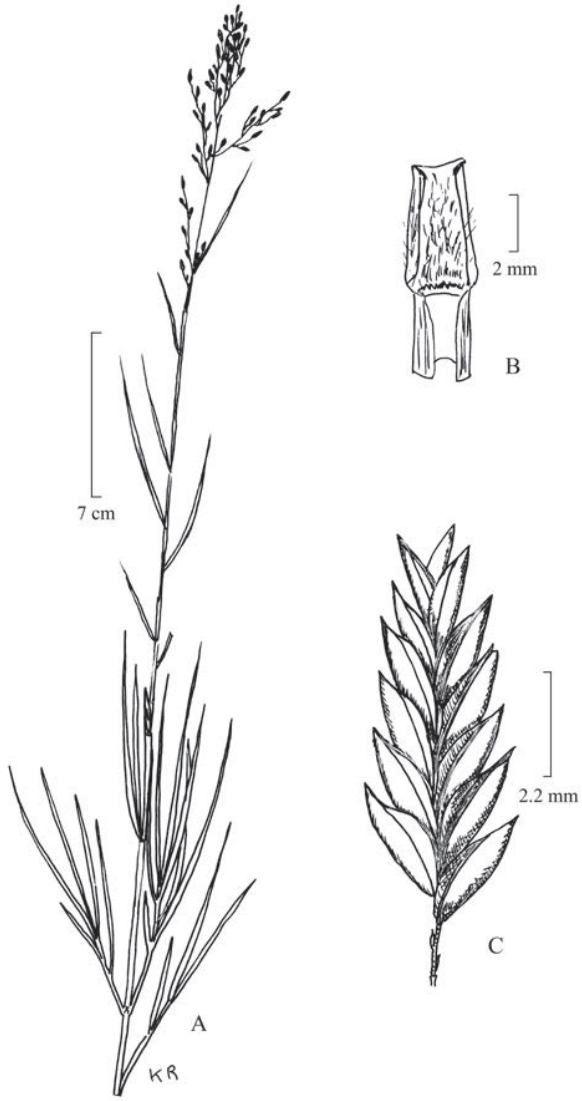


FIGURE 97. *Eragrostis barteri.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *A. Voillant 2772* (US-2473043).

90. *Eragrostis ciliaris* (L.) R. Br.

FIGURE 99

Eragrostis ciliaris (L.) R. Br., Narr. Exped. Zaire 478. 1818.
Common names: *sorgobo, subu*; gophertail lovegrass, woolly lovegrass.

Caespitose annuals. Culms 5–50 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves mainly cauline; sheaths longer than blade, slightly compressed, open, glabrous, ribbed, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 2–12 cm long, 1–3 mm wide, linear, convolute, flaccid, glabrous, margins smooth or scaberulous, bases narrow, apex acuminate. Panicles 1–20 cm long, spiciform, linear or oblong, continuous or interrupted; branches stiff, glandular. Spikelets 2–4.5 mm long, 6–12-flowered, ovate, laterally compressed; lemmas 0.8–1.5 mm long, awnless; palea keels pectinate-ciliate. Distribution: throughout the tropics.

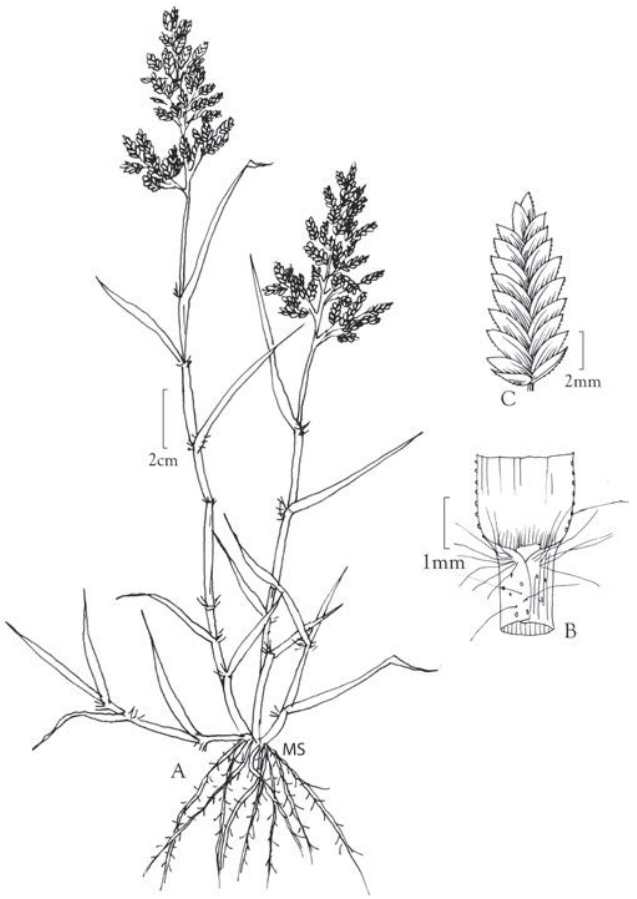


FIGURE 98. *Eragrostis cilianensis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A, B drawn from *R. Kanal 670* (US-320567); C modified from Peterson (2003).

91. *Eragrostis gangetica* (Roxb.) Steud.

FIGURE 100

Eragrostis gangetica (Roxb.) Steud., Syn. Pl. Glumac. 1: 266. 1854
Common names: *fitti fitti, tadjit*; slim-flower lovegrass.

Loosely to densely caespitose annuals. Culms 15–60 cm high, geniculately ascending, slender; branching sparse from lower culms; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves mostly basal; sheaths open, glabrous; oral hairs

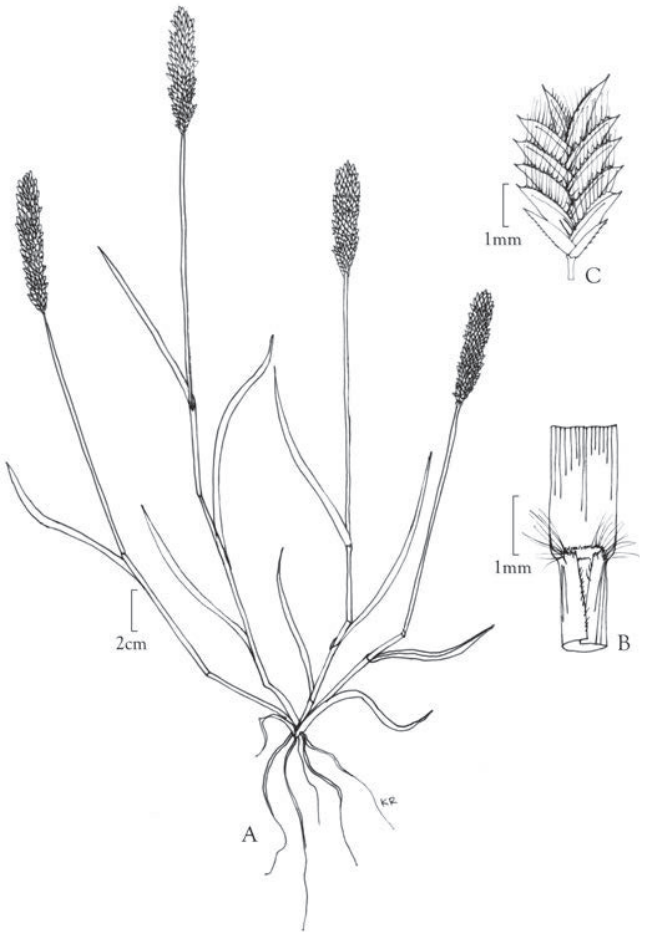


FIGURE 99. *Eragrostis ciliaris.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A, B drawn from *R. Kanal 670* (US-320567); C modified from Peterson (2003).

present; ligules ciliate membrane; blades 3–15 cm long; 0.1–0.3 cm wide, linear, flat or involute, glabrous or scaberulous above, bases very slightly rounded, apex acuminate. Panicles 6–20 cm long, ovate, branches straight. Spikelets 3–10 mm long, solitary, oblong, laterally compressed; lemmas awnless. Distribution: tropical Africa, Asia, and South America.

92. *Eragrostis japonica* (Thunb.) Trin.

FIGURE 101

Eragrostis japonica (Thunb.) Trin., Mém. Acad. Imp. Sci. St.-Pétersbourg, Sér. 6, Sci. Math. 1(4): 405. 1830.
Common names: Japanese lovegrass, pond lovegrass.

Caespitose annuals. Culms 10–80 cm tall, erect, geniculate; internodes glabrous, ribbed; nodes dark; butt sheaths glabrous.

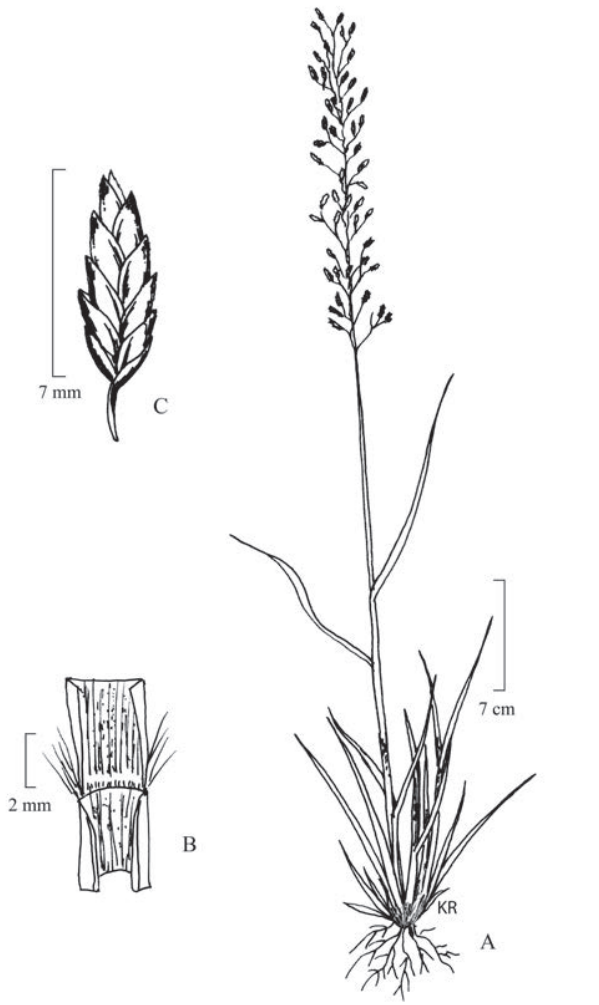


FIGURE 100. *Eragrostis gangetica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *P. N. de Heemo & S. O. Magaji 1960* (US-2640017).

Leaves basal and cauline; sheaths hairy, ribbed, margins smooth; oral hairs present; ligules 0.3–0.6 mm long, fringe of hairs; blades 3–25 cm long, 1–5 mm wide, linear, flat, flaccid, scabrous, bases narrow, apex acuminate. Panicles 4–50 cm long, open, lanceolate or ovate. Spikelets 1–2 mm long, 4–14-flowered, oblong or ovate, laterally compressed; lemmas 0.7–1 mm long, awnless. Habitat: sandy soils in alluvial flats and drainages. Distribution: tropical Africa to southeastern Asia.

93. *Eragrostis lingulata* Clayton

FIGURE 102

Eragrostis lingulata Clayton, Kew Bull. 20: 269. 1966.

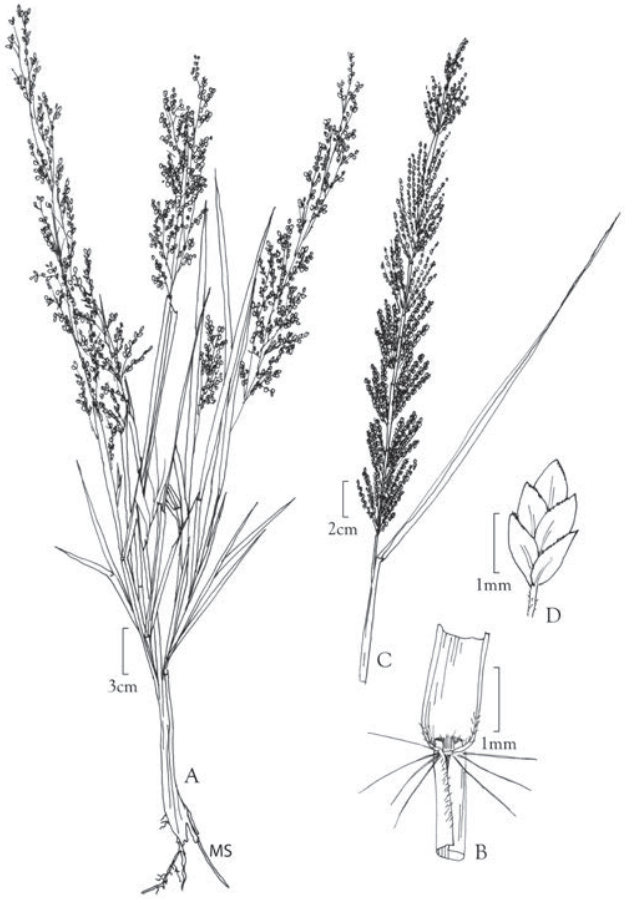


FIGURE 101. *Eragrostis japonica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B–D drawn from *S. Laegaard 21316* (US-3432588).



FIGURE 102. *Eragrostis lingulata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from Poilecot (1995).

Caespitose annuals. Culms 20–30 cm high, erect, geniculate; internodes glabrous; butt sheaths glabrous, scarious. Leaves mostly cauline; leaf sheaths glabrous; ligules ciliate membrane; blades 4–8 cm long, 2–4 mm wide, linear, flat, glaucous, pilose above. Panicles 6–15 cm long, open, linear or elliptic, with short primary branches. Spikelets 7–35 mm long, solitary, linear, laterally compressed; lemmas awnless. Distribution: tropical West Africa.

94. *Eragrostis pilosa* (L.) P. Beauv.

FIGURE 103

Eragrostis pilosa (L.) P. Beauv., Ess. Agrostogr. 71, 162, 175. 1812.

Common names: *wolo gaman, wolo kaman*; Indian lovegrass, slender meadow grass.

Solitary annuals. Culms 8–70 cm tall, erect, branched; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths open, striated, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 2–15 cm long, 1–3 mm wide, linear, flat, straight, spreading, glabrous, margins smooth, bases narrow, apex acuminate. Panicles 4–25 cm long, open, elliptic or ovate; primary branches whorled at lower nodes, eglandular, bearded in axils. Spikelets 3–7 mm long, 0.7–1.2 mm wide, 4–14-flowered, linear, laterally compressed; lemmas 1.2–1.7 mm long, awnless. Distribution: tropical and warm temperate regions.

95. *Eragrostis plurigluma* C. E. Hubb.

FIGURE 104

Eragrostis plurigluma C. E. Hubb., Bull. Misc. Inform. Kew 1934: 116. 1934.

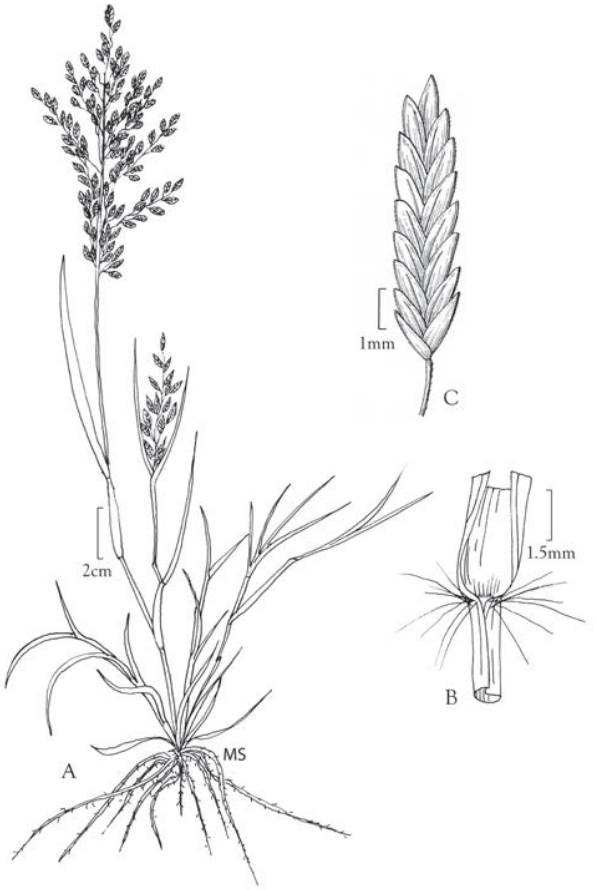


FIGURE 103. *Eragrostis pilosa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *H. A. Allard 21862* (US-2236901); C modified from Peterson (2003).

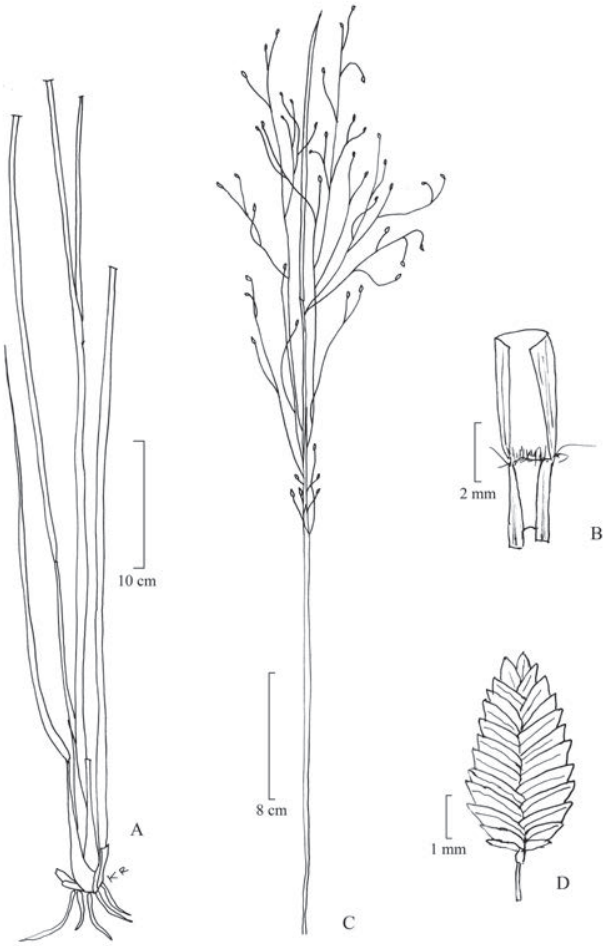


FIGURE 104. *Eragrostis plurigluma.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *H. M. Richards 1313* (US-2612361), *H. Jacques-Felix 7192* (US-2621296).

Densely caespitose, perennials. Culms 60–120 cm long, erect; glabrous at the nodes; branching sparse, rising from the lower culms or unbranched; butt sheaths glabrous, chartaceous, persistent. Leaves mostly basal; sheaths glabrous; ligules ciliate membrane; blades 25–45 cm long; 1–2.5 mm wide, tightly involute or convolute, glaucous, glabrous, apex attenuate or filiform. Panicles 10–30 cm long, an open panicle, effuse, branches capillary, flexuous. Spikelets 6–7.5 mm long, solitary, elliptic, or oblong, laterally compressed; lemmas awnless. Distribution: tropical Africa.

96. *Eragrostis prolifera* (Sw.) Steud.

FIGURE 105

Eragrostis prolifera (Sw.) Steud., Syn. Pl. Glumac. 1: 278. 1854. Common name: Dominican lovegrass.

Caespitose perennials. Culms 60–150 cm long, geniculately ascending; branching ample, arising from midculm, lateral branches fastigiated; butt sheaths glabrous. Leaves mostly cauline; sheath glabrous, ligules ciliate membrane, blades 5–20 cm long; 1–3 mm wide, convolute, coriaceous, stiff, apex acuminate. Panicles 7–17 cm long, open, oblong; branches 1–4 cm long, stiff, spreading, bearing spikelets almost to the base. Spikelets 4–15 mm long, solitary, linear, or oblong, laterally compressed; lemmas awnless. Distribution: tropical Africa and South America.

97. *Eragrostis squamata* (Lam.) Steud.

FIGURE 106

Eragrostis squamata (Lam.) Steud., Syn. Pl. Glumac. 1: 274. 1854.

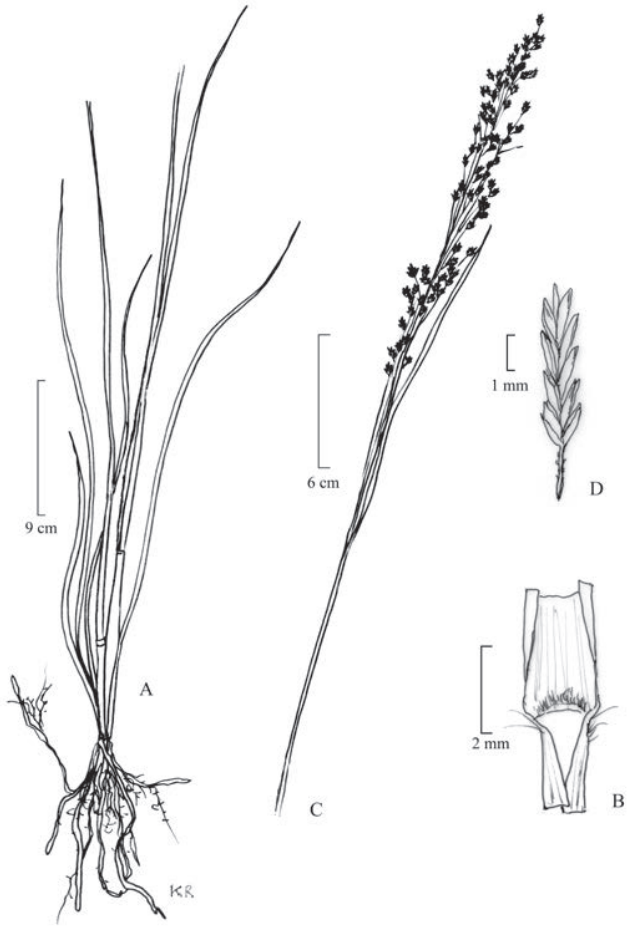


FIGURE 105. *Eragrostis prolifera*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *O. Hagerup 105* (US-1718598).

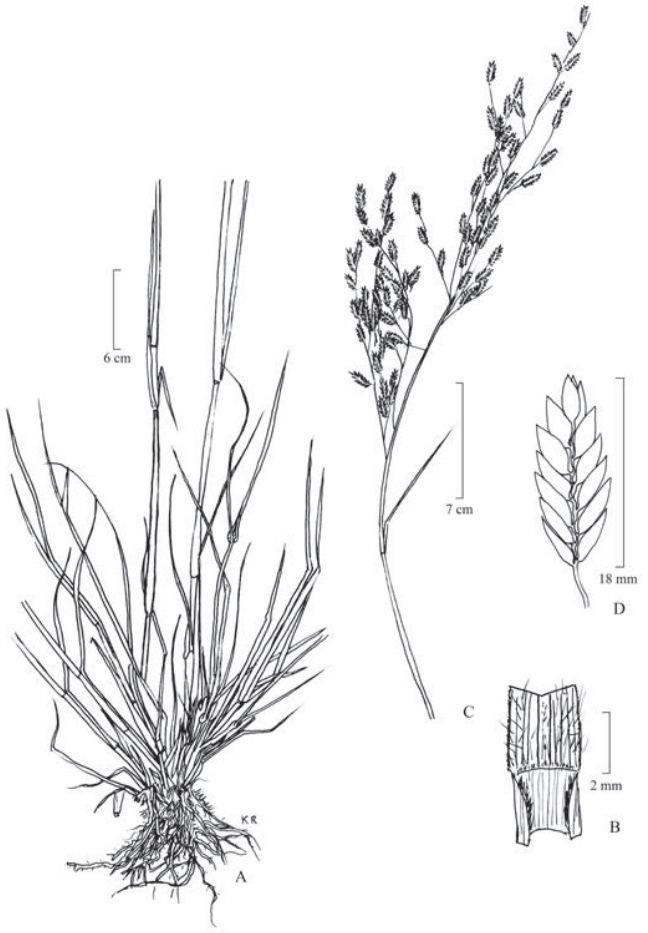


FIGURE 106. *Eragrostis squamata*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. Laegaard, H. Mipro & T. Sobere 18375A* (US-3432613).

Caespitose perennials. Culms 30–120 cm long, erect. Leaves mostly cauline; sheaths glabrous or pilose; ligules ciliate membrane; blades 5–30 cm long; 1–3(–6) mm wide; glaucous, scabrous above, apex attenuate. Panicles 6–35 cm long, an open panicle, elliptic; primary panicle branches ascending, stiff, straight, bearing spikelets almost to the base. Spikelets 5–25 mm long, appressed, solitary, oblong, or ovate, laterally compressed; lemmas awnless. Distribution: tropical Africa.

98. *Eragrostis tenella* (L.) P. Beauv. ex Roem & Schult.

FIGURE 107

Eragrostis tenella (L.) P. Beauv. ex Roem & Schult. Syst. Veg. 2: 576. 1817. [*Eragrostis amabilis* (L.) Wight and Arn.; *Poa amabilis* L.]
Common names: bug's egg grass, feather lovegrass.

Caespitose annuals. Culms 5–40 cm tall, erect; internodes glabrous, glossy; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed margins smooth; oral hairs present; ligules 0.2–0.3 mm long, ciliate membrane; blades 2–8 cm long, 1–3 mm wide, flat, spreading, straight, glabrous, margins smooth, apex acuminate. Panicles 2–14 cm long, open, narrowly ovate; primary branches spreading. Spikelets 1.5–2.5 mm long, 4–8-flowered, ovate or oblong, laterally compressed; lemmas 0.7–1.1 mm long, awnless. Distribution: throughout the tropics.

99. *Eragrostis tremula* Hochst. ex Steud.

FIGURE 108

Eragrostis tremula Hochst. ex Steud., Syn. Pl. Glumac. 1: 269. 1854.
Common names: *paguire jaule, wolo kaman*.

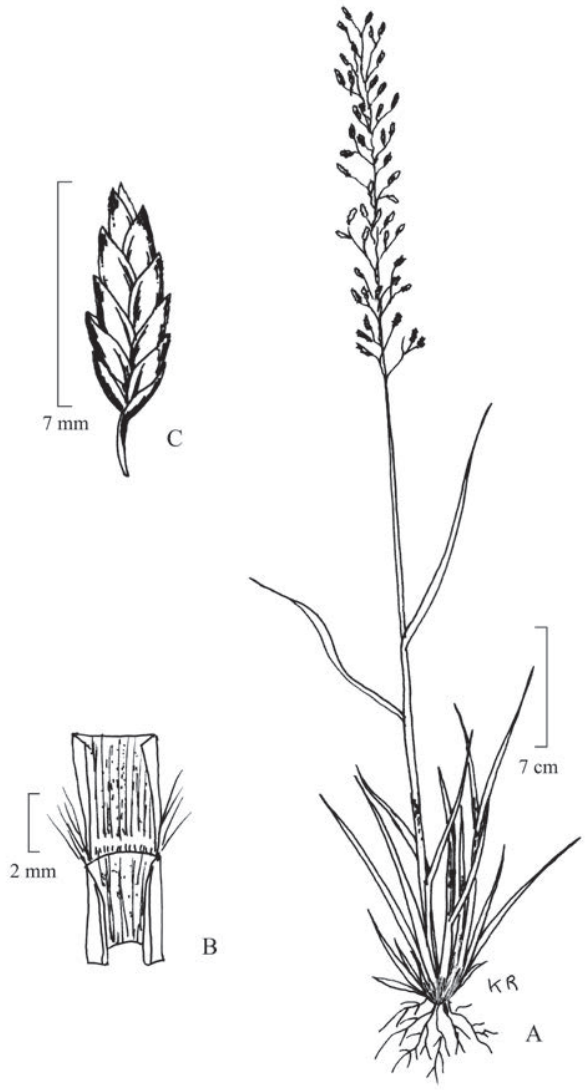


FIGURE 107. *Eragrostis tenella.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *J. W. Helfer 160* (CAI); B, C drawn from *S. Laegaard 15857* (US-3292354).

Caespitose annuals. Culms up to 35 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous with a whitened collar, margins smooth; oral hairs present; ligules 2 mm long, ciliate membrane; blades 8–25 cm long, 1–3 mm wide, convolute; straight; spreading, glabrous, with a whitened collar, base slightly rounded and hairy, apex attenuate. Panicles 7–30 cm long, ovate; branches flexuous, eglandular, glabrous or bearded in axils. Spikelets 5–25 mm long, 1.5–2 mm wide, 10–60-flowered, linear, laterally compressed; lemmas 1.5–1.7 mm long, awnless. Distribution: tropical Africa to India.

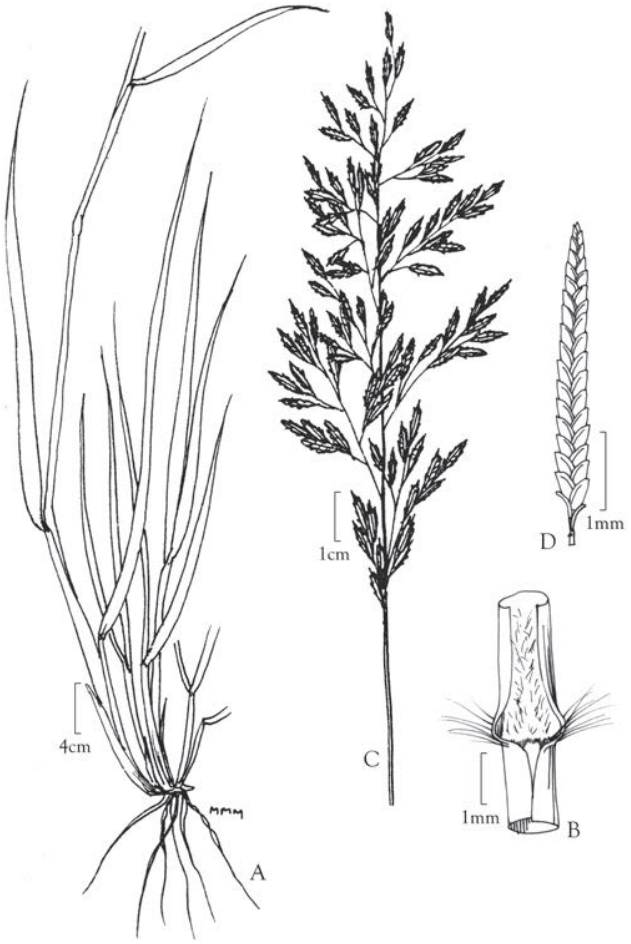


FIGURE 108. *Eragrostis tremula.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from *K. Ibrahim 1707* (CAI); B, D drawn from *W. A. Archer 9398* (US-2236337).

100. *Eragrostis turgida* (Schumach.) De Wild.

FIGURE 109

Eragrostis turgida (Schumach.) De Wild., Compagnie du Kasai 250. 1910.

Loosely tufted annuals. Culms 8–60 cm high, erect, or geniculately ascending; internodes glabrous; branching sparse, arising from the lower culms. Leaves basal and cauline; sheaths longer than leaf blades, compressed or keeled, glabrous; ligules ciliate membrane; blades 4–18 cm long, 0.2–0.8 cm wide, relatively broad leaves, linear, flat, glabrous with a whitened collar, apex acuminate. Panicles 3–14 cm long, open, oblong or ovate; branches few flowered. Spikelets 3–20 mm long, solitary, oblong-ovate; lemmas awnless. Distribution: tropical Africa to temperate Asia.

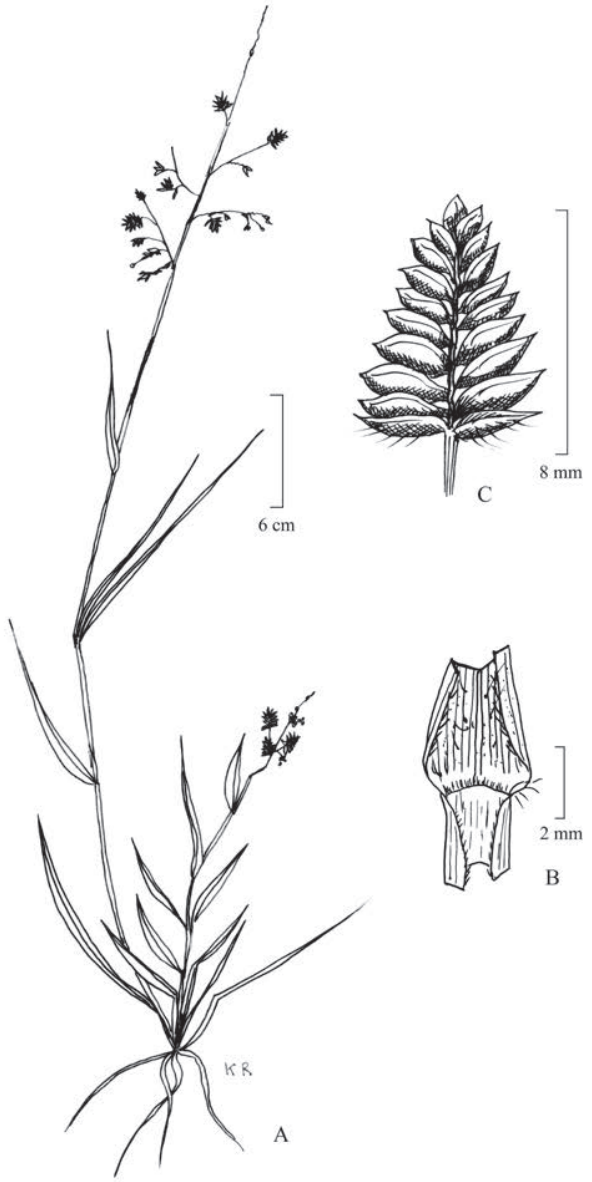


FIGURE 109. *Eragrostis turgida*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *John M. Fay 7327* (US-3267901), *William Burger 835* (US-2465207).

101. *Eriochloa fatmensis* (Hochst. & Steud.) Clayton

FIGURE 110

Eriochloa fatmensis (Hochst. & Steud.) Clayton, Kew Bull. 30: 108. 1975.

Common names: ants millet, tropical cup grass.

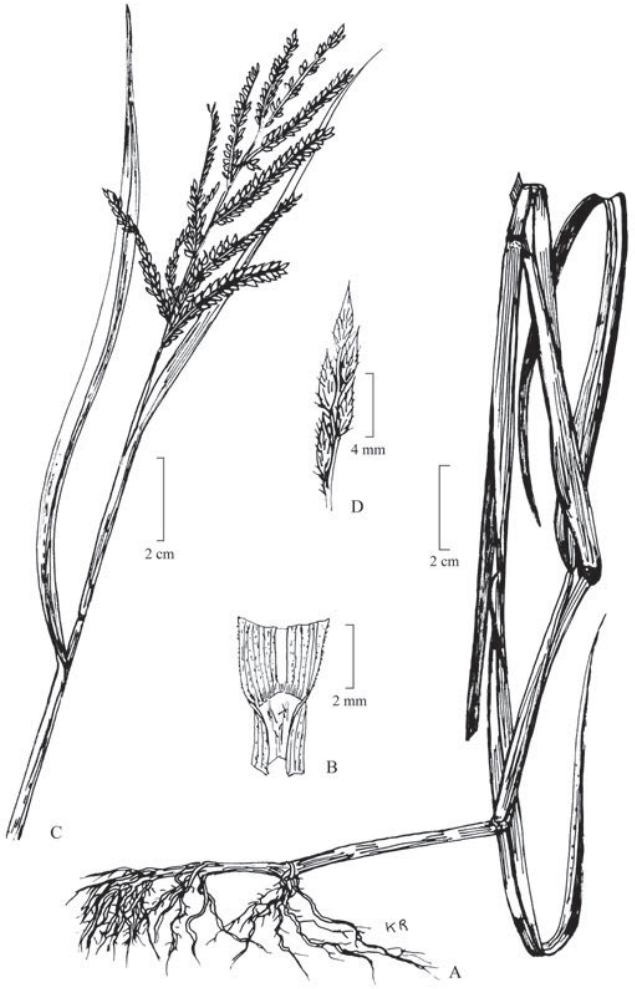


FIGURE 110. *Eriochloa fatmensis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *P. J. Greenway 7422* (US-1913557).

Caespitose variable annuals. Culms 10–120 cm long, erect, or geniculately ascending; internodes glabrous, striate; nodes dark; branching ample, arising from mid culm; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, finely nerved; ligules fringe of hairs; blades 3–30 cm long, 2–10 mm wide, linear-lanceolate, flat or folded, glabrous, bases slightly rounded, apex acuminate. Inflorescence 3–20 racemes borne along a central axis, unilateral; racemes 1–5 cm long. Spikelets (2.5–)3–5 mm long, solitary, lanceolate, dorsally compressed, acuminate; principal lemma mucronate, the mucros 0.3–1 mm long. Distribution: tropical Africa, temperate Asia, India, and Australia.

102. *Euclasta condylotricha* (Hochst. ex Steud.) Stapf

FIGURE 111

Euclasta condylotricha (Hochst. ex Steud.) Stapf, Fl. Trop. Afr. 9: 181. 1917. [*Dichanthium condylotrichum* (Hochst. ex Steud.) Roberty]
Common name: mock bluestem.

Caespitose annuals. Culms 25–200 cm long, prostrate; internodes glabrous; nodes bearded, lower nodes rooting; branching sparse on the lower culms; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous with sparsely hairy shoulders; ligules 0.2 mm long, ciliate membrane; blades 5–25 cm long; 0.2–1 cm wide, glabrous, distinct white midrib visible for about ½ their length, bases rounded, margins scabrous, apex attenuate. Inflorescences composed of racemes. Racemes 2–5 cm long, 2–15, digitate, drooping. Spikelets 3–4 mm long, paired, elliptic, dorsally compressed; lemma apex entire, 1-awned; principal lemma awns 20–40 mm long, geniculate with a twisted column. Distribution: tropical Africa, Asia, Central America, and South America.



FIGURE 111. *Euclasta condylotricha.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *Renvoize & Abdallah 2377* (US-2769371).

103. *Hackelochloa granularis* (L.) Kuntze

FIGURE 112

Hackelochloa granularis (L.) Kuntze, Revis. Gen. Pl. 2: 776. 1891. [*Mnesithea granularis* (L.) de Koning and Sosef]
Common names: *bambari ladde, ngoriri*; hare's maze, lizard-tail grass.

Coarse annuals. Culms 5–50 cm high, erect; internodes glabrous, glossy; nodes bearded; branching sparse, arising from

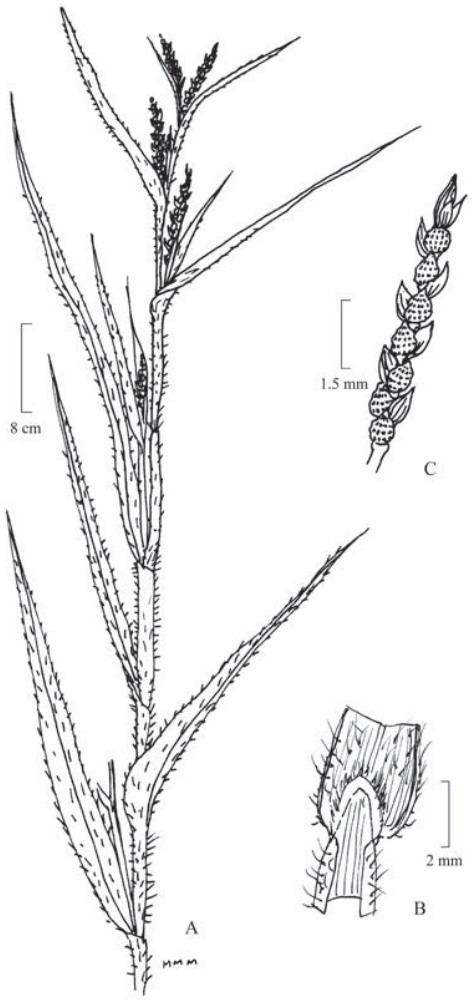


FIGURE 112. *Hackelochloa granularis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *E. Milne-Redhead & P. Taylor 9047 A* (US-2461364).

midculm; butt sheaths sparsely hairy. Leaves mostly cauline; leaf sheaths loose or inflated, slightly compressed or keeled, hirsute with tubercle-based hairs, margins ciliate; ligules 2–3 mm long, ciliolate membrane; blades 2–15 cm long, 0.4–1.2 cm wide, linear to lanceolate, flat, hirsute or coarsely hispid with tubercle-based hairs, with finely recessed midribs, margins ciliate, bases subamplexicaul or cordate, acute apex. Racemes 0.5–1.5 cm long, exserted or embraced at base by subtending spatheole. Spikelets 1.6–2.2 mm long, pedicellate, in pairs; lemma apex obtuse, awnless. Distribution: throughout the tropics.

104. *Hemarthria altissima* (Poir.) Stapf & C. E. Hubb.

FIGURE 113

Hemarthria altissima (Poir.) Stapf and C. E. Hubb., Bull. Misc. Inform. Kew 1934: 109. 1934.

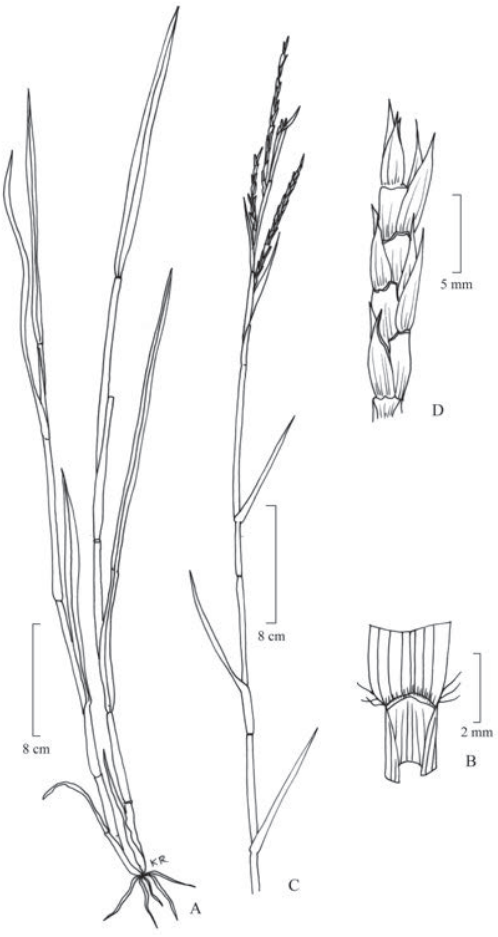


FIGURE 113. *Hemarthria altissima.* A. Habit. B. Ligule, sheath, and blade. C. Part of inflorescence. D. Spikelet. A drawn from *N. El Hadidi s.n.* (CAI); C, D drawn from A. *J. Oakes 1517* (US-3030926); B drawn from Poilecot (1999).

Common names: Batavian quick grass, red swamp grass, snake grass.

Caespitose perennials, stolons present. Culms 100–250 cm tall, decumbent or prostrate; branching from midculm; internodes glabrous; nodes bearded, dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy on the upper ⅓, margins smooth, collars ciliate; ligules 1–2 mm long, ciliate membrane; blades 5–15 cm long, 2–4 mm wide, linear, flat, spreading, flaccid, glabrous, margins cartilaginous, apex acute. Racemes 4–10 cm long, single, erect, partially enclosed in sheaths, smooth. Spikelets 4–6 mm long, in pairs, lanceolate, dorsally compressed; lemma apex acute, awnless. Distribution: southern Europe and Africa.

105. *Hyparrhenia cyanescens* (Stapf) Stapf

FIGURE 114

Hyparrhenia cyanescens (Stapf) Stapf, Fl. Trop. Afr. 9: 351. 1919.

Caespitose perennials, rhizomes short. Culms 200–300 cm long, 4–8 mm in diameter, erect or geniculately ascending, robust; internodes smooth, solid; butt sheaths glabrous. Leaves mostly cauline; sheaths firm, terete, glabrous; auricles 1–6 mm long, sometimes absent, erect; ligules 2–3 mm long, membranous, scarious, truncate; blades 15–50 cm long, 3–8 mm wide,



FIGURE 114. *Hyparrhenia cyanescens.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D Bogdan Collection, NARS, Kitale, Kenya; B drawn from Poilecot (1999).

linear, flat, glaucous, glabrous, midrib whitish above and prominent below, margins scabrous, bases tapering toward midrib, apex attenuate. Inflorescence terminal and axillary, subtended by a spatheole, exserted or embraced at base by subtending leaf; spatheoles 3.5–5 cm long, linear, or lanceolate, membranous, glaucous, purple, glabrous; racemes 1.7–2.5 cm long, 2 in number, paired, deflexed. Spikelets 4.5–6 mm long, in pairs, lanceolate, dorsally compressed; lemma apex dentate, bidentate, awned; principal lemma awns 28–34 mm long from the sinus, geniculate, with a twisted column; column with hairs 0.2–0.4 mm long. Distribution: tropical Africa.

106. *Hyparrhenia rufa* (Nees) Stapf

FIGURE 115

Hyparrhenia rufa (Nees) Stapf, Fl. Trop. Afr. 9: 304. 1918.
Common names: jaragua grass, thatching grass.



FIGURE 115. *Hyparrhenia rufa.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *H. B. Johnston 1181* (US-1818182).

Caespitose perennials, rhizomes short. Culms 30–250 cm tall, 2–6 mm in diameter near base, robust, erect, lateral branches fastigiated, arising from lower culms; internodes glabrous, solid; nodes dark; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous; wider than blades at the collar; ligules 2–3 mm long, eciliate membrane; blades 30–60 cm long, 2–8 mm wide, linear, flat, rigid, scabrous, margins smooth, apex attenuate. Inflorescence composed of racemes, subtended by a spatheole, exserted; spatheoles 3–5 cm long, linear to lanceolate, membranous; racemes 2–2.5 cm long, paired, erect, unilateral. Spikelets 3.5–4.5 mm long, in pairs, lanceolate, dorsally compressed; lemma apex dentate; bidentate, awned; principal lemma awns 20–30 mm long from the sinus, geniculate, with a twisted, pubescent column. Distribution: tropical Africa and southern Africa; introduced in tropical America and Australia.

107. *Hyparrhenia subplumosa* Stapf

FIGURE 116

Hyparrhenia subplumosa Stapf, Fl. Trop. Afr. 9: 366. 1918.

Caespitose perennials. Culms 200–300 cm tall, erect, robust; branching ample, arising from lower culms; internodes glabrous; butt sheaths glabrous. Leaves mostly cauline; sheaths terete, firm, pale green or glaucous, glabrous or pilose; oral hairs bearded; ligules 2–3 mm long, ciliate membrane, scarious, truncate; blades 20–60 cm long, 0.3–1 cm wide, linear, flat, or slightly folded, glaucous; midribs prominent beneath, whitish, glabrous above, hirsute or sparsely hairy below, margins scabrous, bases narrowed, simple or slightly narrowed bases, apex acuminate. Inflorescences synflorescence compound, paniculate 20–50 cm long. Spatheoles 3–7 cm long, lanceolate, membranous, glaucous, or purple. Spikelets 6.5–7.5 mm long, in pairs, lanceolate, dorsally compressed; principal lemma awns 45–75 mm long overall, from a sinus, geniculate, with twisted column. Distribution: tropical Africa.

108. *Hyperthelia dissoluta* (Nees ex Steud.) Clayton

FIGURE 117

Hyperthelia dissoluta (Nees ex Steud.) Clayton, Kew Bull. 20: 441. 1966.
Common names: *neanso, ntaso*; yellow hard grass, yellow thatching grass.

Caespitose perennials. Culms 100–300 cm long, erect; branches arising from the lower culms; internodes glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths keeled, scabrous with membranous margins; auricles erect or absent; ligules 2–3(–24) mm long, membranous, apex lacerate; blades 15–30 cm long, 3–6 mm wide, glaucous, flat, scabrous with pale

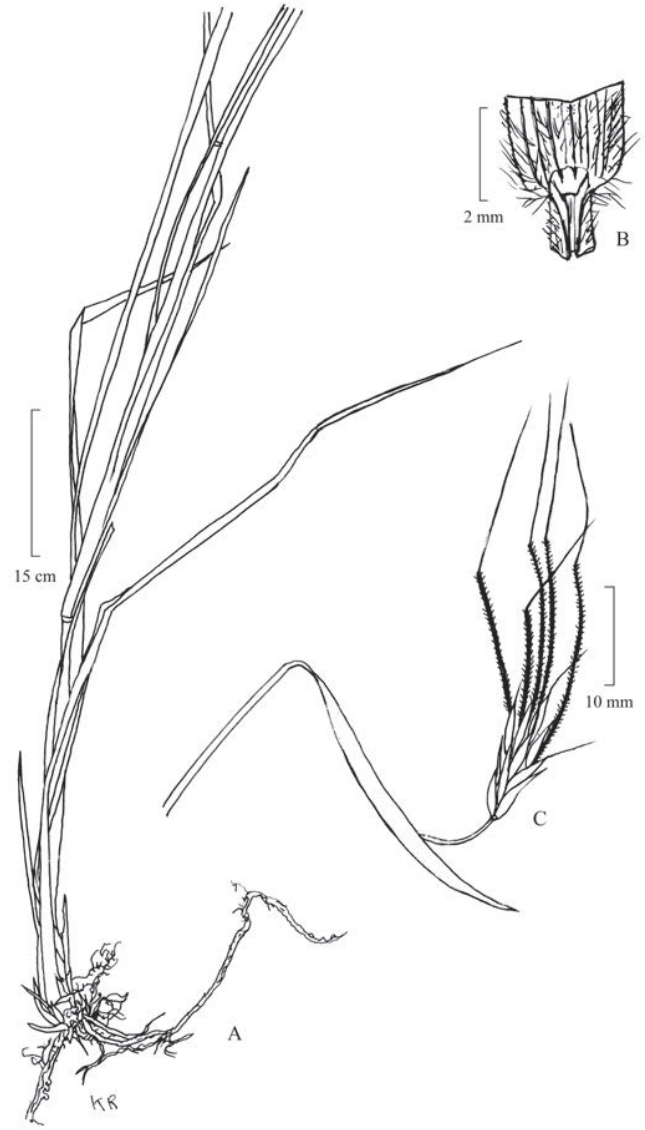


FIGURE 116. *Hyparrhenia subplumosa.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *A. T. Semple 167* (US-2076164), *L. Smook 930* (US-2988270).

whitish midribs slightly recessed above and protruding below on the lower ½, margins smooth, apex attenuate. Racemes 2–3 cm long, embraced at base by subtending leaf; spatheoles 5–7 cm long, lanceolate, scarious, glabrous or hirsute; racemes 2–3 cm long, paired, erect. Spikelets 10–14 mm long, in pairs, linear, subterete; principal lemma awns 50–100 mm long from a sinus, geniculate, the column twisted, hirtellos. Distribution: tropical Africa to western Indian Ocean; North and South America.

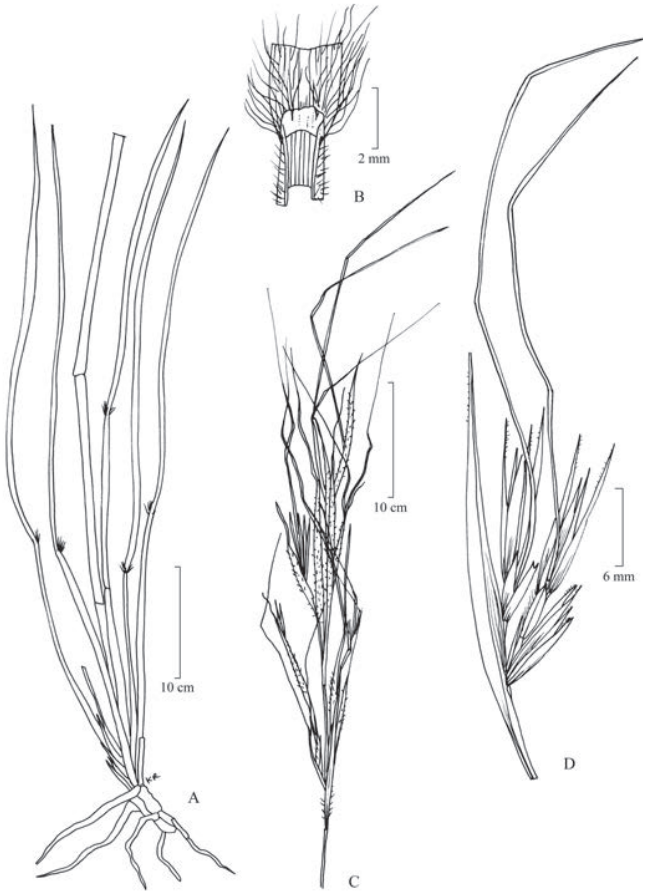


FIGURE 117. *Hyperthelia dissoluta.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *PCV du Toit 1109* (US-2969747), *L. Smook 930* (US- 2988270).

109. *Imperata cylindrica* (L.) P. Beauv.

FIGURE 118

Imperata cylindrica (L.) P. Beauv., Ess. Agrostogr. 8, 165, 177, pl. 5, f. 1. 1812.

Common names: *gombi, soyo*; cogon grass, lalang grass.

Caespitose perennials with elongated, scaly rhizomes. Culms 10–100 cm tall, erect; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves mostly basal; sheaths sparsely hairy on the upper ⅓, margins sparsely hairy; ligules 1–2 mm long, ciliate membrane; blades 3–80 cm long, 2–20 mm wide, flat or conduplicate, ascending, scabrous, margins scaberulous, apex acute. Panicles 3–22 cm long, spiciform, linear; primary branches appressed to a central axis, with evident branchlets on axis, each branch bearing few fertile spikelets; rachis tough, subterete;

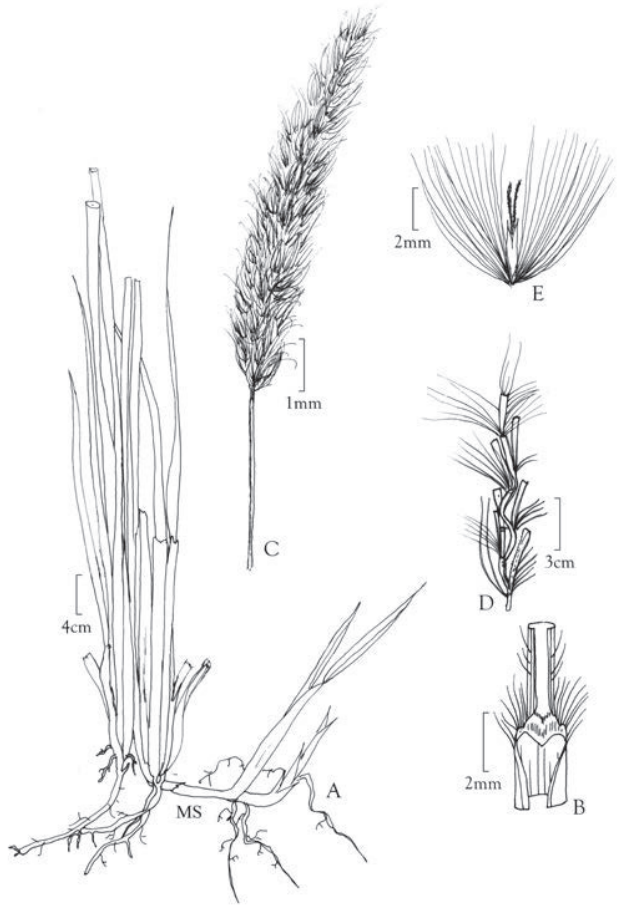


FIGURE 118. *Imperata cylindrica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Part of inflorescence. E. Spikelet. A, C drawn from *L. Boulos s.n.* (CAI); B, D, E drawn from *J. Ash s.n.* (US-2819790).

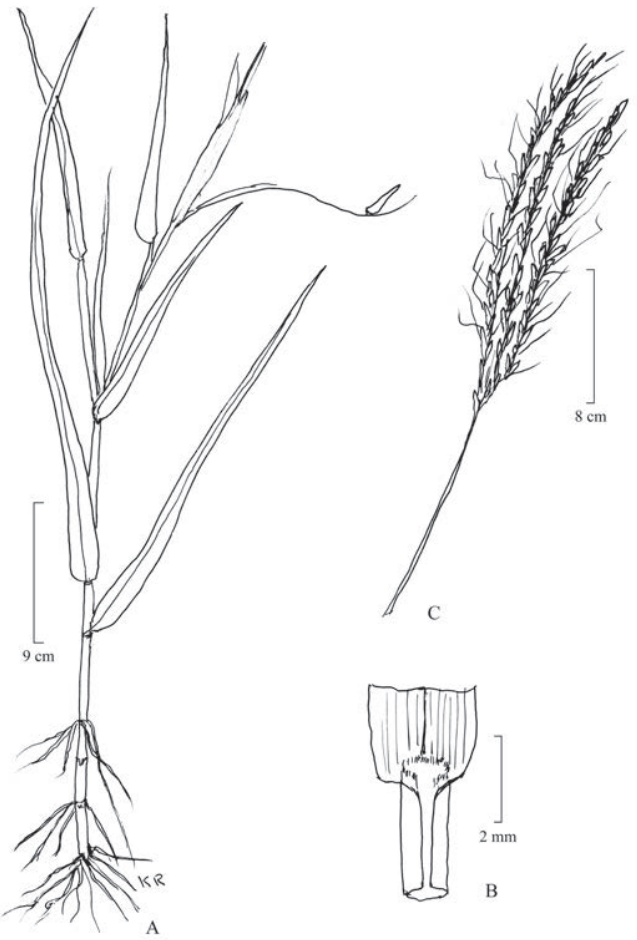


FIGURE 119. *Ischaemum polystachyum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *V. Demoalin 5791* (US-3287877) and *P. Hiepkoet, W. Schultze & Molel 1012* (US-3012438).

internodes filiform. Spikelets 2.2–6 mm long, in pairs, lanceolate, subterete, falling entire; callus bearded, hairs white, base truncate; lower lemmas about 1.4 mm long, awnless. Distribution: tropical and warm temperate regions in the Eastern Hemisphere; introduced in North America.

110. *Ischaemum polystachyum* J. Presl

FIGURE 119

Ischaemum polystachyum J. Presl, Reliq. Haenk. 1: 328. 1830. Common name: paddle grass.

Perennials with elongated rhizomes. Culms 30–150 cm long, decumbent, or prostrate; branching from midculm; internodes glabrous; nodes without roots or rooting from below; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous; ligules 2.5 mm long, membranous; blades 5–25 cm long, 0.3–2 cm wide, linear-lanceolate, glabrous or pubescent, apex acuminate. Inflorescence with 2–5(–8) paired or digitate racemes; racemes 3–15 cm long, unilateral. Spikelets 4–7 mm long, in pairs, lanceolate or oblong, dorsally compressed; principal lemma awns 5–20 mm long from a sinus, geniculate, column twisted, glabrous. Distribution: tropical Africa to western Indian Ocean, temperate Asia and Australia.

111. *Lasiurus scindicus* Henrard

FIGURE 120

Lasiurus scindicus Henrard, Blumea 4: 514. 1941. Common name: sewan grass.

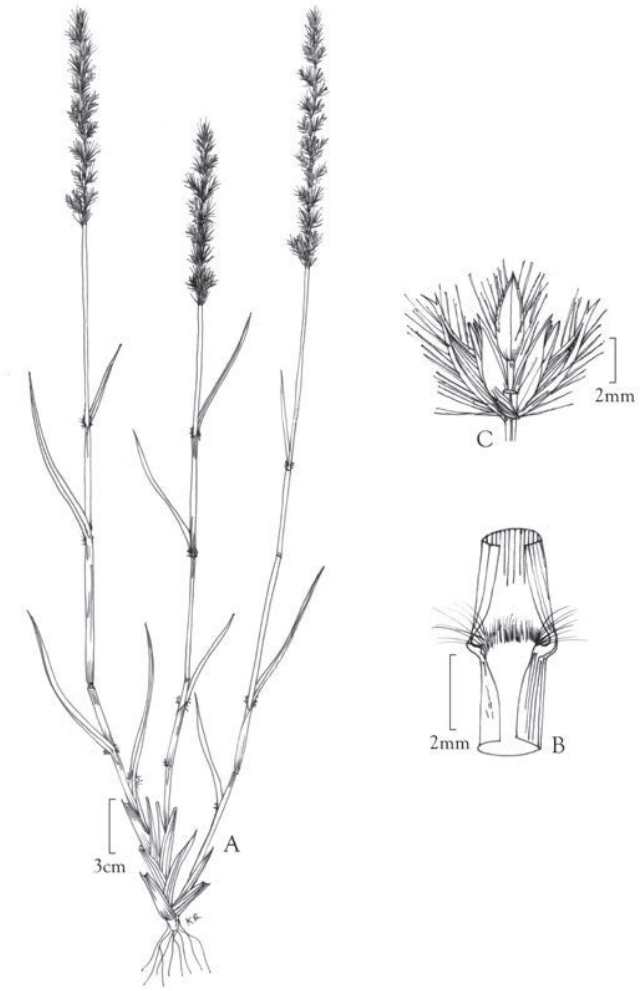


FIGURE 120. *Lasiurus scindicus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B, C drawn from *A. Rawi, R. Jalili & A. Amer s.n.* (US-2970973).

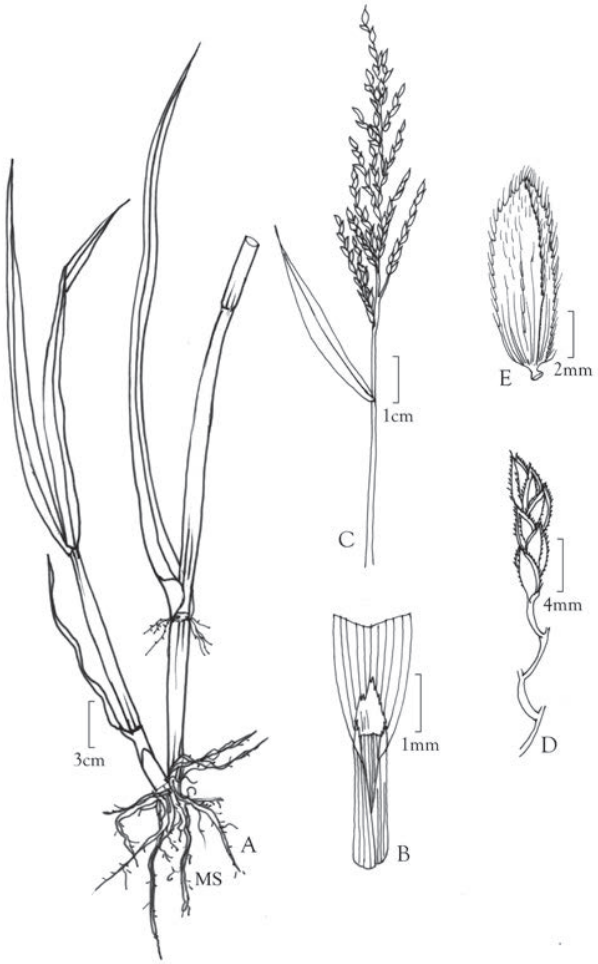


FIGURE 121. *Leersia hexandra.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Part of inflorescence. E. Spikelet. A drawn from *Täckholm s.n.* (CAI); B, E drawn from *J. Newbould* & *R. M. Harley 4434* (US 2473157); C, D modified from Ibrahim and Kabuye (1988).

Caespitose perennials with short, thick, woody, scaly rhizomes. Culms 30–100 cm tall, erect, straight, often woody below; branching sparsely below, simple or suffruticose; internodes glabrous; nodes dark; butt sheaths sparsely hairy, often silky. Leaves mostly cauline; sheaths longer than blade, flattened, ribbed, hairy on the upper ⅓, margins smooth; ligules fringe of hairs; blades 8–30 cm long, 1–3(–6) mm wide, flat or involute, spreading, flaccid, glaucous, glabrous, margins smooth, apex attenuate. Racemes 5–12 cm long, single, surrounded by hairs, partially included in the sheath; rachis fragile at the nodes, flattened, glabrous, pubescent or villous, ciliate on margins; rachis internodes cuneate, disarticulating horizontally. Spikelets 7–9 mm long, lanceolate, dorsally compressed, 3 at a node, falling as a unit; lemmas awnless. Distribution: tropical East Africa, temperate Asia, and northwestern India.

112. *Leersia hexandra* Sw.

FIGURE 121

Leersia hexandra Sw., Prodr. Veg. Ind. Occ. 21. 1788.
Common names: rice grass, southern cut grass, white grass.

Mat-forming perennials with long, stout-branched, elongated rhizomes. Culms 20–100 cm tall, erect, geniculate, slender, weak or stout; branching sparse, arising from midculm or unbranched; internodes pubescent or smooth, striate; nodes bearded, dark, lower nodes rooting; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous or scabrous, margins smooth;

auricles clawlike; ligules 1–2(–4) mm long, a ciliate membrane, truncate; blades 5–20 cm long, 1–3(–8) mm wide, flat, spreading, flaccid, glaucous, scabrous, midribs indistinct and slightly recessed above and protruding below with scabrid retrorse hairs, margins scabrous, apex acute-acuminate. Panicles 5–12 cm long, 1–4 cm wide, open, elliptic or oblong; primary branches bearing spikelets almost to the base. Spikelets (3.2–)3.4–4.8(–5.2) mm long, (1–)1.2–1.4(–1.7) mm wide, oblong, laterally compressed, falling as a unit; lemmas awnless; anthers 6 in number. Distribution: throughout the tropics.

113. *Leptothrium senegalense* (Kunth) Clayton

FIGURE 122

Leptothrium senegalense (Kunth) Clayton, Kew Bull. 27: 151. 1972.

Common names: *ainguiem, firri*; hook grass.

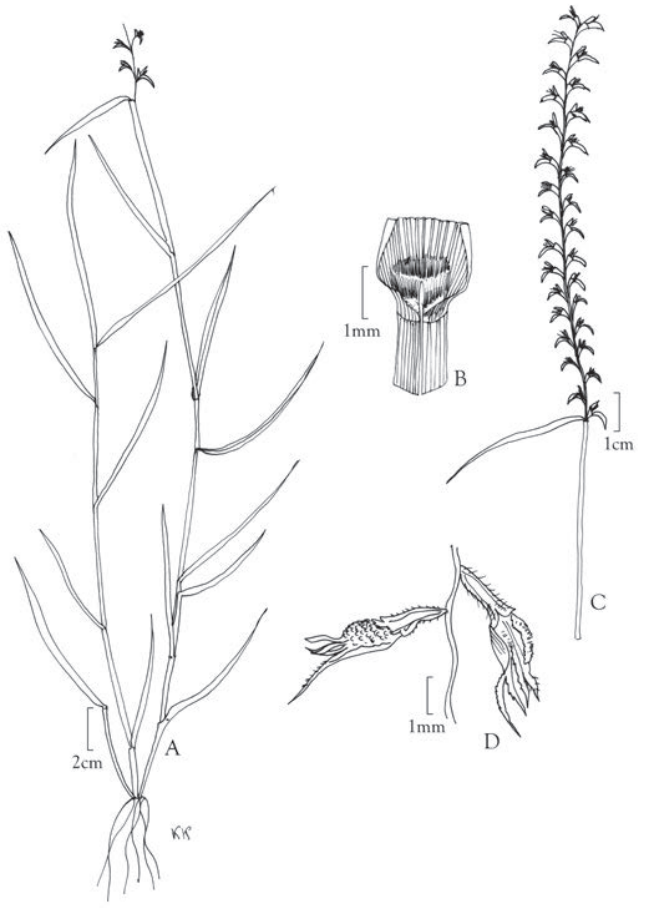


FIGURE 122. *Leptothrium senegalense.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Two spikelets. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from *O. Hagerup 206* (US-1718603).

Caespitose, short-lived perennials. Culms up to 75 cm tall, wiry, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than the blade, flattened, ribbed, glabrous, margins membranous; ligules a fringe of hairs; blades 2–10 cm long, 1–2 mm wide, involute, spreading, straight, scabrous, margins smooth, apex attenuate. Inflorescence composed of racemes borne along a central axis; racemes 2–17 cm long, spreading, cuneate, bearing few fertile spikelets. Spikelets 2.5–8 mm long, linear to lanceolate, laterally compressed, in pairs, gibbous; lemmas awnless. Distribution: tropical Africa and southwestern Asia.

114. *Loudetia hordeiformis* (Stapf) C. E. Hubb.

FIGURE 123

Loudetia hordeiformis (Stapf) C. E. Hubb., Bull. Misc. Inform. Kew 1934: 431. 1934.

Caespitose annuals. Culms 40–150 cm tall, slender, erect; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves mostly cauline; sheaths finely striate with short, stiff, tuberculate hairs; ligules with densely ciliate rims; blades 15–30 cm long,

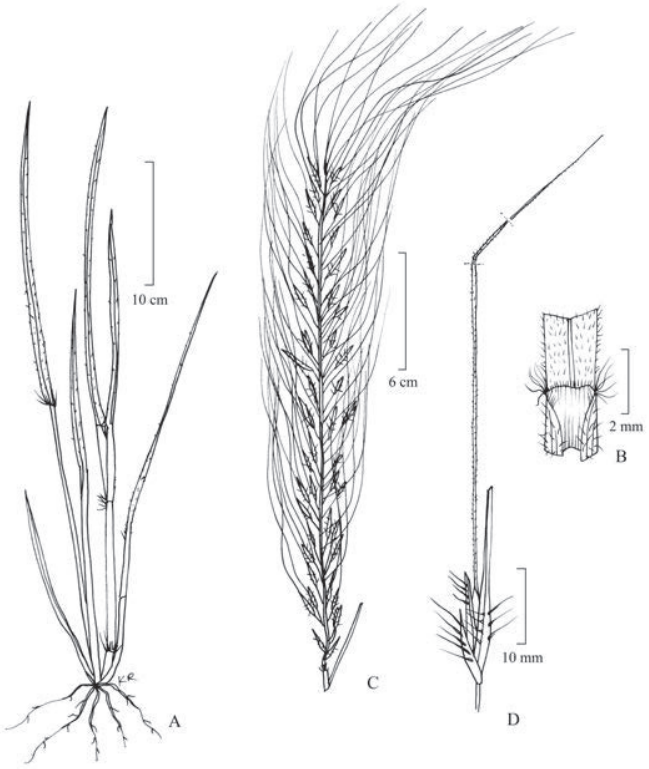


FIGURE 123. *Loudetia hordeiformis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from Poilecot (1999).

4–8 mm wide, flat, loosely to densely hairy, minutely tuberculate, purplish above, margins tending to roll inward, scabrid, bases narrowed to barely rounded, apex acute, sometimes setaceous. Panicles 15–30 cm long, 0.4–2 cm wide. Spikelets 12–20 mm long, solitary, lanceolate, laterally compressed; lemma apex dentate, with triangular lobes, acute, awned; principal lemma awns 8–10 mm long from a sinus, geniculate, flattened below, column twisted and deciduous. Distribution: tropical Africa.

115. *Loudetia phragmitoides* (Peter) C. E. Hubb.

FIGURE 124

Loudetia phragmitoides (Peter) C. E. Hubb., Bull. Misc. Inform. Kew 1934: 428. 1934.
Common name: erapo grass.

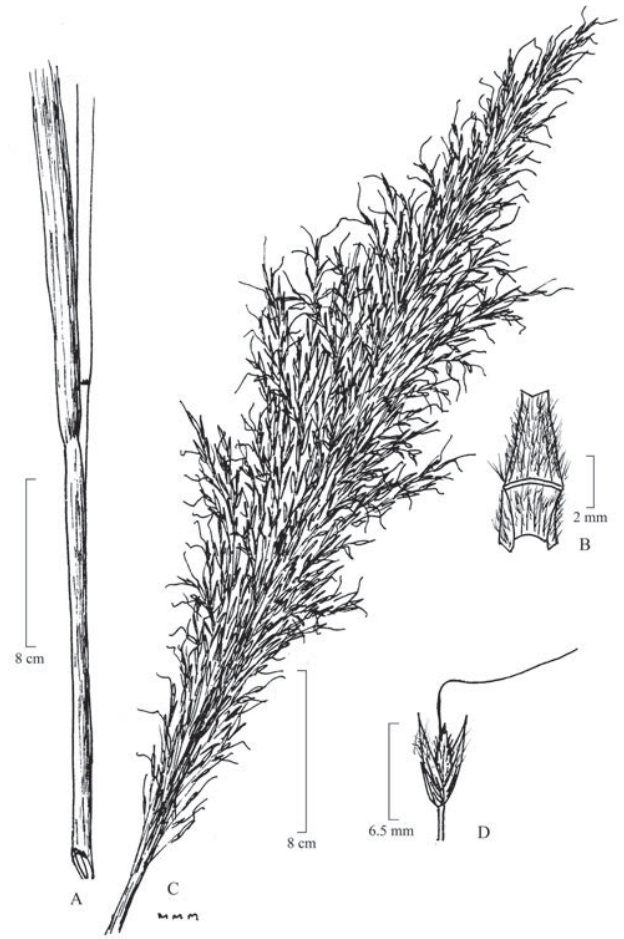


FIGURE 124. *Loudetia phragmitoides.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1999).

Perrenials, reedlike. Culms 200–400 cm long, erect, stout, woody; sparsely branching below; internodes distally glabrous or hirsute; nodes bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than the internodes, tough, coarsely striate upward, densely pilose, villous, or hispid and tuberculate especially near summit; ligules a fringe of hairs; blades 50–100 cm long, 1–2 cm wide, flat or convolute, stiff, erect, strongly nerved, densely and softly pilose or glabrous, scaberulous above, margins scabrid, apex attenuate. Panicles 40–60 cm long, oblong. Spikelets 6–7 mm long, solitary, laterally compressed; lemma apex dentate, bidentate with triangular lobes, acute, awned; principal lemma awns 10–20 mm long from a sinus, geniculate, flattened below, column 1.5–3 mm long, twisted, persistent. Distribution: tropical Africa.

116. *Loudetia simplex* (Nees) C. E. Hubb.

FIGURE 125

Loudetia simplex (Nees) C. E. Hubb., Bull. Misc. Inform. Kew 1934: 431. 1934.
Common names: besem grass, russet grass.

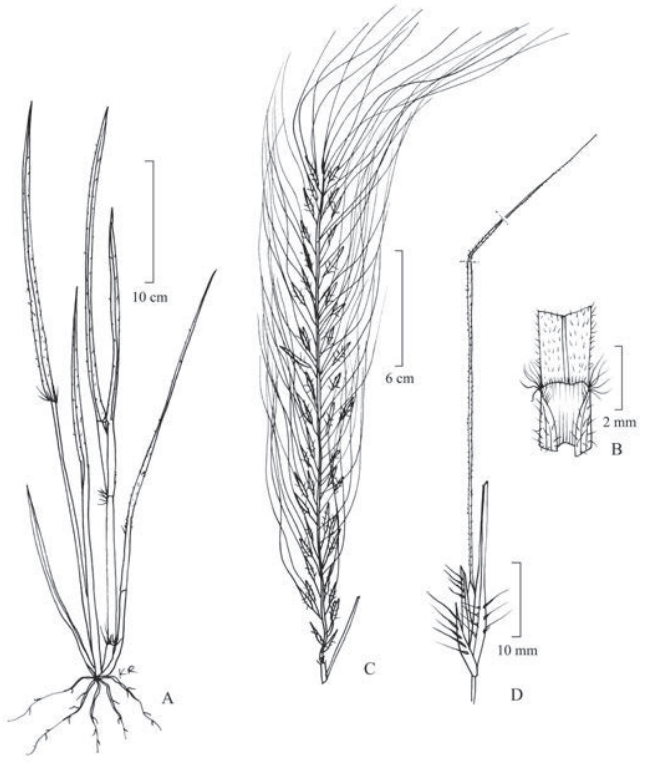


FIGURE 125. *Loudetia simplex.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Plantae Angolensium Gossweilerii 8561* (US-1162229).

Caespitose perennials. Culms 30–150 cm long, erect; branching below; internodes glabrous, pubescent or pilose; nodes black, glabrous or bearded; butt sheaths pubescent or woolly, persistent with fibrous dead sheaths. Leaves mostly basal; sheaths glabrous; ligules densely ciliolate rim; blades 10–30 cm long, 2–5 mm wide, flat or convolute, scabrous, sometimes almost falsely petiolated, apex attenuate. Panicles 10–30 cm long, linear to ovate. Spikelets 8–13 mm long, solitary, lanceolate, slightly laterally compressed; lemma apex bidentate with triangular lobes, acute, the lobes 0.2–1 mm long, awned; principal lemma awns 25–50 mm long from a sinus, geniculate, flat below, column twisted and deciduous. Distribution: tropical Africa to western Indian Ocean.

117. *Loudetia togoensis* (Pilg.) C. E. Hubb.

FIGURE 126

Loudetia togoensis (Pilg.) C. E. Hubb., Bull. Misc. Inform. Kew 1934: 431. 1934.
Common names: *firala nkasan, gombi sogo, nkasan.*

Caespitose or solitary annuals. Culms 30–100 cm tall, erect, or geniculately ascending; branching below; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous; ligules fringe of hairs; blades 2.5–20 cm long, 0.2–1 cm wide, flat, pubescent, white midrib recessed above and protruding below on lower ⅓, apex attenuate. Panicles 6–25 cm long, lanceolate; spikelets 22–27 mm long, in threes, lanceolate, laterally compressed; lemma margins involute and interlocking with palea keels; principal lemma awns 9–20 mm long from a sinus, geniculate, subterete below, column twisted, deciduous, the column 1.5–4 mm long, hirsute. Distribution: tropical Africa.

118. *Loudetiopsis kerstingii* (Pilg.) Conert

FIGURE 127

Loudetiopsis kerstingii (Pilg.) Conert, Bot. Jahrb. Syst. 77: 289. 1957.

Caespitose or solitary, annuals. Culms 45–100 cm long; geniculately ascending or decumbent; branching below; internodes glabrous; nodes bearded, dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous except for a densely velvety hairy covering at the base; ligules fringe of hairs; blades 10–20 cm long; 1.5–2.5 mm wide, aciculate or linear, flat or involute. Panicles 5–12 cm long, oblong. Spikelets 14–17 mm long, in threes, lanceolate, slightly laterally compressed; lemma apex lobed; principal lemma awns 70–120 mm long from a sinus, geniculate, flat below, column twisted, deciduous, the column 30–40 mm long, pubescent. Distribution: tropical West Africa.



FIGURE 126. *Loudetia togoensis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *B. Brand 474* (US-2209025).

119. *Micrachne obtusiflora* (Benth.) P. M. Peterson

FIGURE 128

Micrachne obtusiflora (Benth.) P. M. Peterson, Taxon 64(3): 459. 2015. [*Brachyachne obtusiflora* (Benth.) C. E. Hubb.]

Caespitose annuals. Culms 10–20(–25) cm tall, slender, erect or geniculately ascending, leafy throughout; branching below; internodes glabrous; nodes dark. Leaves basal and cauline; sheaths longer than leaf blades, glabrous; ligules ciliolate membrane; blades 0.5–3.5(–5) cm long, needlelike, spreading, strongly revolute, often recurved, glabrous with apiculate apex. Inflorescence composed of a single raceme; racemes 3–6 cm long,

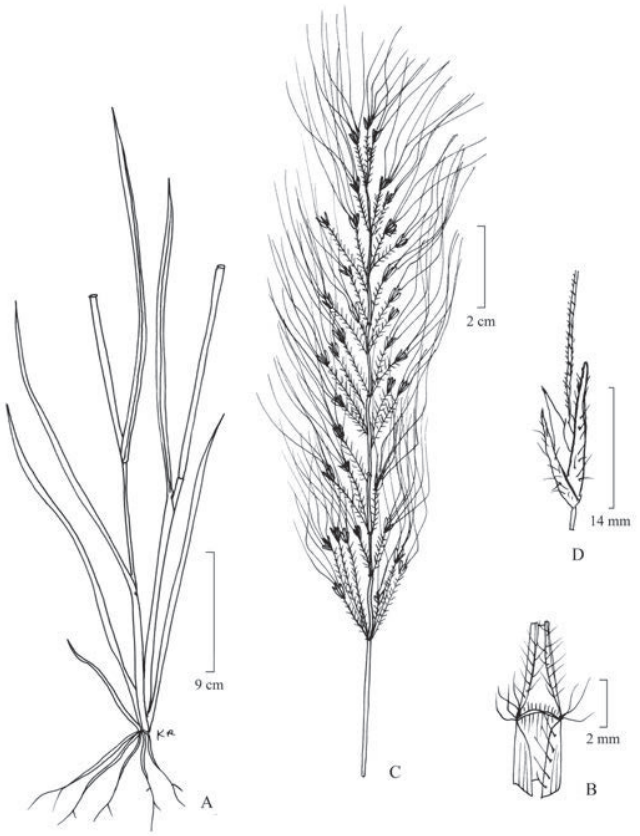


FIGURE 127. *Loudetiopsis kerstingii*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Ake Assi 9271* (US-1162229), *J. B. Hall 776* (US-3115060).

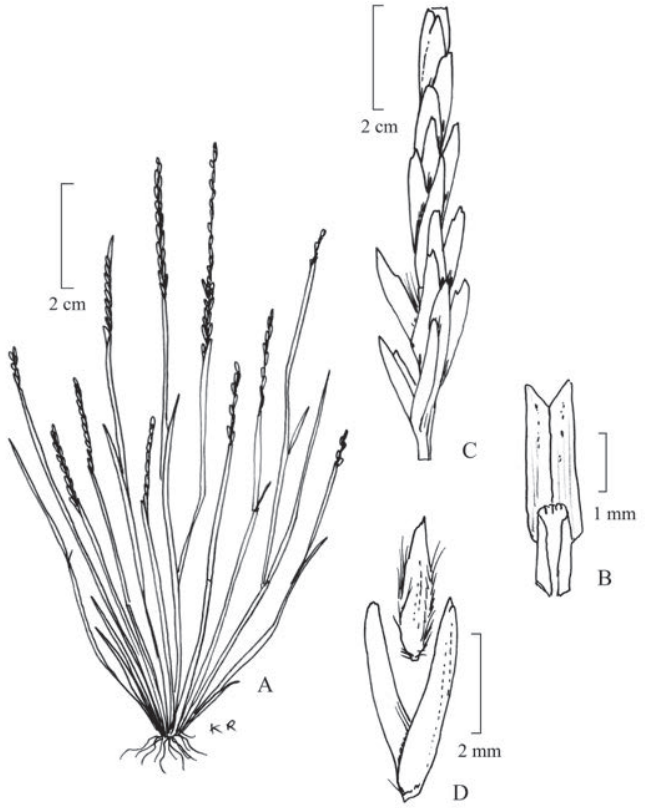


FIGURE 128. *Micrachne obtusiflora*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *C. W. Agyakwa 454* (US-2209014).

slender, erect or slightly curved, unilateral. Spikelets 2.2–2.5 mm long, packed broadside to rachis, crowded, regular, 2-rowed, with a single fertile floret, oblong, laterally compressed; lemma apex emarginate, awnless. Distribution: tropical Africa.

120. *Microchloa indica* (L.f.) P. Beauv.

FIGURE 129

Microchloa indica (L.f.) P. Beauv., Ess. Agrostogr. Atlas: 13, pl. 20, f. 8. 1812.
Common names: *dugu konsina, fukobi, kulumbi*.

Caespitose annuals or perennials. Culms 5–50 cm tall, erect, wiry, forming small dense mats; with a few branches below; butt sheaths withering. Leaves mostly basal; sheaths glabrous, slightly compressed; ligules ciliolate membrane; blades 1–8(–11) cm long, 0.3–2 mm wide, filiform, flat, or conduplicate, apex abruptly acute or obtuse. Racemes, 1.4–15 cm long, solitary, unilateral. Spikelets 1.7–2.9 mm long, solitary, lanceolate, slightly dorsally compressed; lemma apex obtuse, awnless. Distribution: tropical Africa, temperate Asia, South America, and Australia.

121. *Oplismenus hirtellus* (L.) P. Beauv.

FIGURE 130

Oplismenus hirtellus (L.) P. Beauv., Ess. Agrostogr. 54, 168, 170. 1812.
Common names: basket grass, ribbon grass, woods grass.

Caespitose perennials. Culms 15–100 cm long, prostrate, solitary; internodes glabrous, ribbed; nodes pubescent, lower nodes rooting. Leaves mostly cauline; sheaths glabrous to sparsely hairy, ribbed, margins ciliate, collars ciliate; ligules ciliate membrane; blades 1–13 cm long, 0.4–2 cm wide, lanceolate to ovate, glabrous to sparsely hairy, bases almost petiolated, apex acuminate. Inflorescences 3–15 cm long, comprising 3–9 racemes, racemes

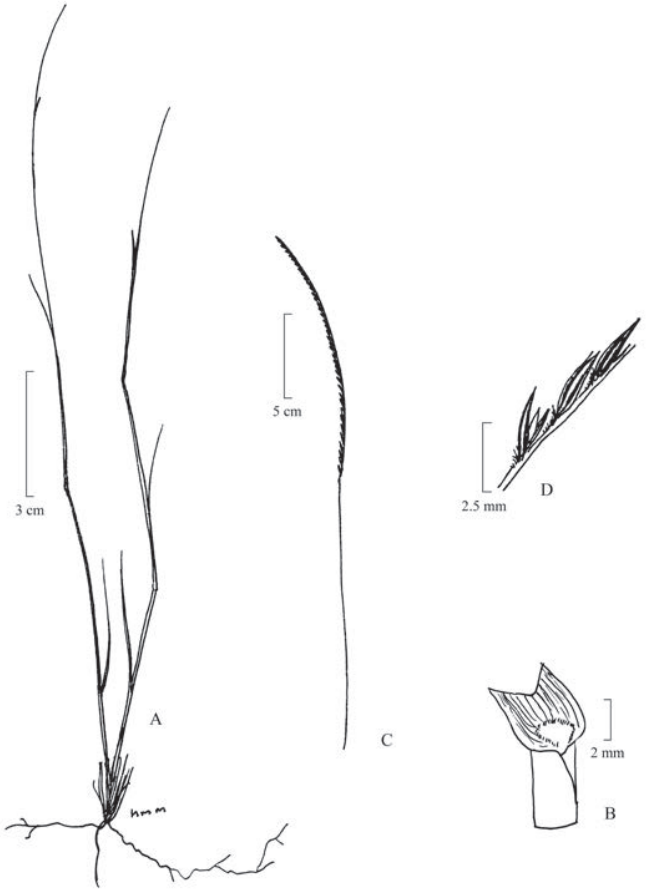


FIGURE 129. *Microchloa indica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1999).

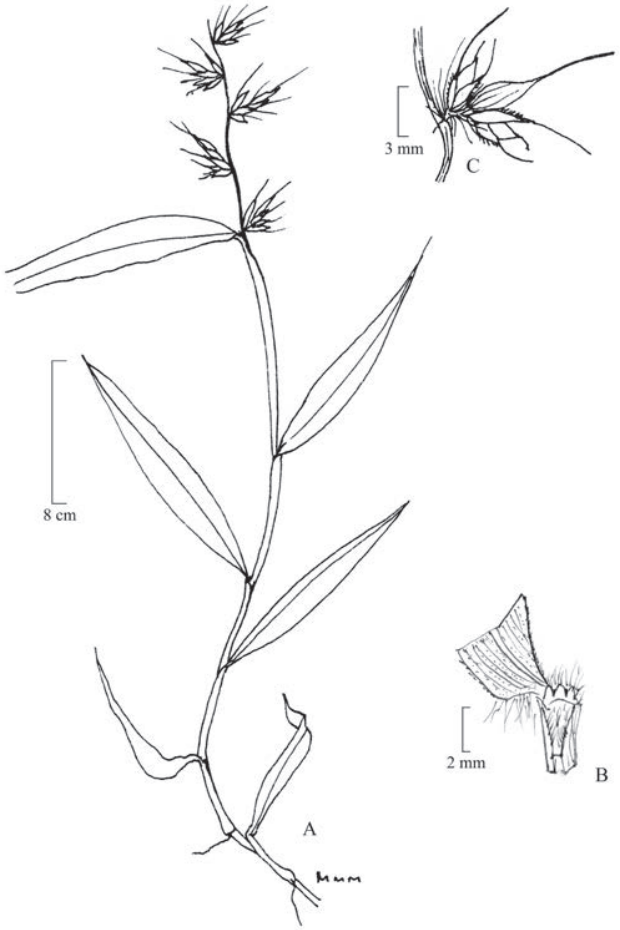


FIGURE 130. *Oplismenus hirtellus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence branch. A–C drawn from Ibrahim and Kabuye (1988).

0.5–3 cm long. Spikelets 2–4 mm long, in pairs, lanceolate, laterally compressed. Lemma apex acute, awnless. Distribution: tropics, worldwide.

122. *Oropetium aristatum* (Stapf) Pilg.

FIGURE 131

Oropetium aristatum (Stapf) Pilg., Bot. Jahrb. Syst. 74: 14. 1947.
Common names: *dedu ia, dedu na, dedu ya*.

Mat-forming annuals. Culms 5–10 cm long, erect or geniculate; branching below. Leaves mostly cauline; sheaths tightly rolled, glabrous; ligules ciliolate membrane; blades 1–2 cm long, about 0.5 mm wide, involute, filiform, needlelike, glabrous, apex acuminate. Racemes 1–2 cm long, single; rachis fragile at the nodes, subcylindrical, the spikelets embedded in two rows. Spikelets 3–3.5 mm long, 1-flowered, lanceolate, dorsally compressed; callus pubescent; lemma apex bidentate, awned; principal lemma awns 2–2.5 mm long from a sinus. Distribution: tropical West Africa.

123. *Oropetium capense* Stapf

FIGURE 132

Oropetium capense Stapf, Fl. Cap. 7: 742. 1900.
Common names: *dedu ia, dedu na, dedu ya*; dwarf grass.

Loosely to densely caespitose perennials. Culms 3–14 cm long, erect; branching below; internodes glabrous; butt sheaths persistent and investing base of culms, with fibrous dead sheaths. Leaves mostly basal; sheaths glabrous; ligules

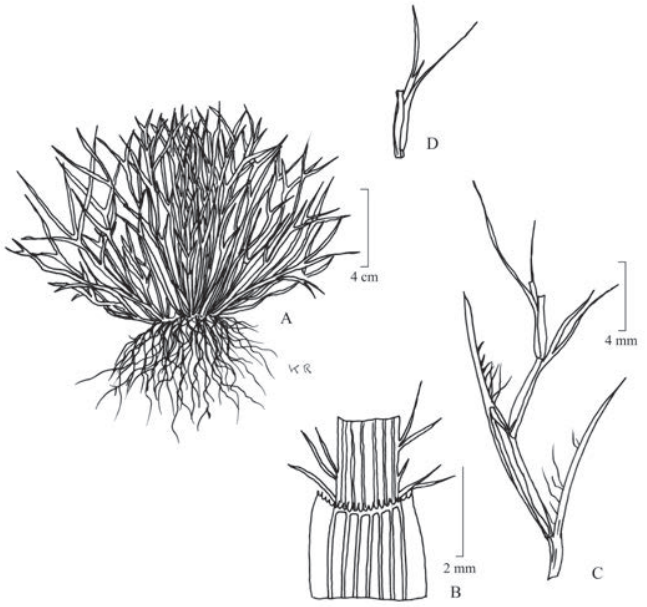


FIGURE 131. *Oropetium aristatum.* A. Habit. B. Ligule, sheath, and blade. C. Raceme. D. Spikelet. A–C Bogdan Collection, NARS, Kitale, Kenya.

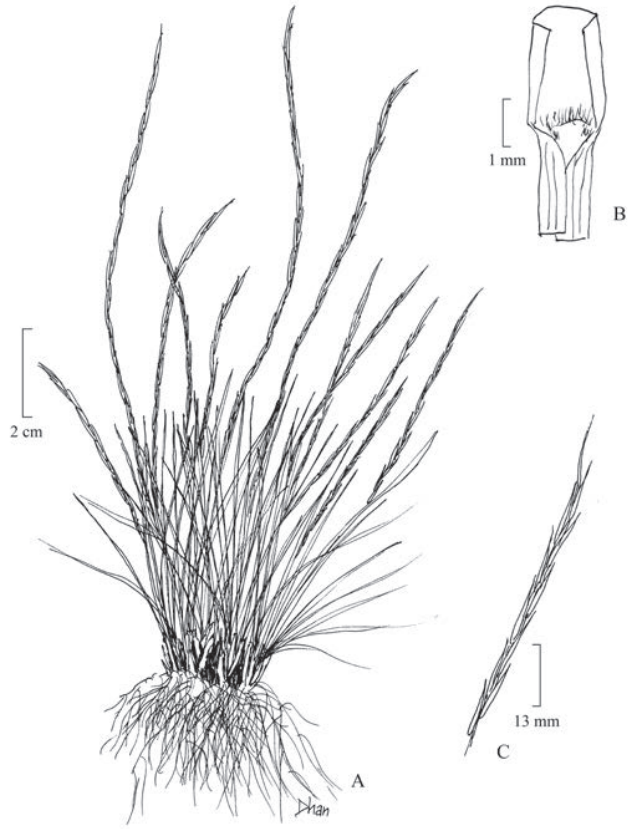


FIGURE 132. *Oropetium capense.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A, C drawn from Ibrahim and Kabuye (1988); B drawn from *Penne E. Matteoda 2124* (US-1984417).

ciliolate membrane; blades 1–4 cm long, 0.5–1.2 mm wide, filiform, flat or conduplicate, stiff, apex obtuse or acute. Racemes 2–3(–10) cm long, single, straight or curved, rachis fragile at the nodes, subcylindrical. Spikelets 2–3(–4) mm long, embedded in two rows, 1-flowered, lanceolate, dorsally compressed; callus pubescent; lemma apex bidentate, awnless. Distribution: tropical and temperate Africa.

124. *Oryza barthii* A. Chev.

FIGURE 133

Oryza barthii A. Chev., Bull. Mus. Natl. Hist. Nat. 16: 405. 1910. Common names: *kumo ara pilu*; Mandinka rice, wild rice.

Caespitose annuals. Culms 60–120 cm long, geniculately ascending, or decumbent, spongy; branching below; internodes glabrous; nodes glabrous, rooting below. Leaves basal and cauline; sheaths scarious, striate, somewhat firm when young later loose and usually wrinkled with age, smooth, glabrous, slightly compressed toward apex; auricles erect; ligules 2–6 mm long, eciliate membrane, truncate or obtuse; blades 15–45 cm long, 0.4–1.3 cm wide, scaberulous, margins scabrous, apex acute to acuminate. Panicles 20–35 cm long, 3–7.5 cm wide, open, obovate. Spikelets 7–11 mm long, solitary, oblong, laterally compressed; lemma apex with a small beak, awned; principal lemma awns (65–)80–160(–190) mm long, pink, hispidulous, stiff. Distribution: tropical and temperate Africa.

125. *Oryza brachyantha* A. Chev. & Roehr.

FIGURE 134

Oryza brachyantha A. Chev. & Roehr., Compt. Rend. Hebd. Séances Acad. Sci. 159: 561. 1914.

Caespitose annuals. Culms 30–80(–100) cm tall, decumbent, or prostrate; internodes glabrous; nodes dark, rooting below. Leaves basal and cauline; sheaths smooth, glabrous; auricles falcate; ligules 1–2 mm long, eciliate membrane, entire or lacerate, truncate; blades 7–19 cm long, 1–5 mm wide, linear, glabrous or scaberulous below, scaberulous above, tapering to an acute point, green often tinged with purple, flaccid, smooth or somewhat asperulous above and along the margins, margins scaberulous, apex acute. Panicles 13–30 cm long, 2.5–5 cm wide,



FIGURE 133. *Oryza barthii.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *E. J. Adjanohoun 279A* (US-2433428).

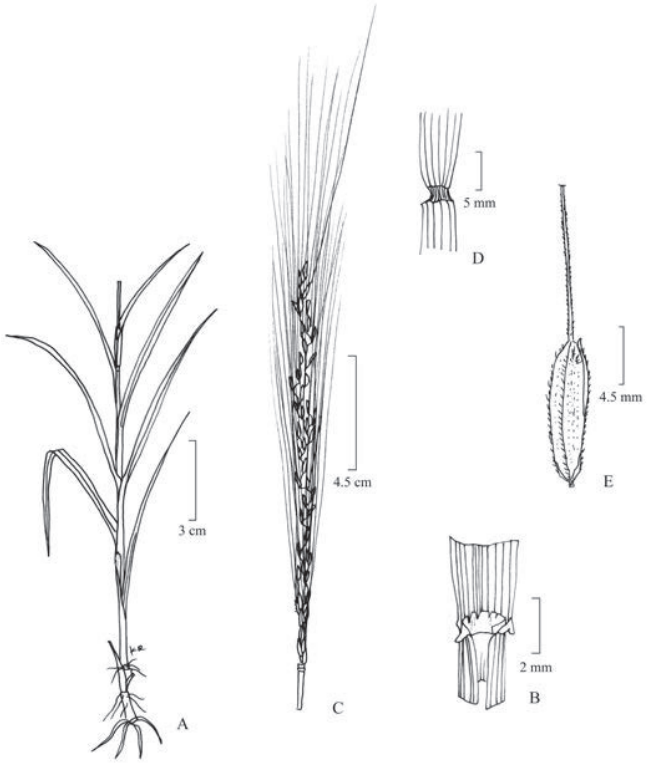


FIGURE 134. *Oryza brachyantha.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Part of inflorescence. E. Spikelet. A–D drawn from *Ake Assi 9261* (US-2537423).

open, ovate. Spikelets 6.5–9.25 mm long, solitary, oblong, laterally compressed; principal lemma awn 7–17 cm long, very slender, straight or somewhat wavy in upper ⅓, scabrous. Distribution: tropical and temperate Africa.

126. *Oryza longistaminata* A. Chev. & Roehr.

FIGURE 135

Oryza longistaminata A. Chev. and Roehr., Compt. Rend. Hebd. Séances Acad. Sci. 159: 561. 1914.
Common names: *bahure, ndiga*; African rice, red rice.

Robust perennials with long, creeping, branched rhizomes. Culms up to 250 cm, 5–10 mm in diameter near base, geniculately ascending or decumbent, spongy; internodes glabrous; nodes dark, rooting below. Leaves basal and cauline; sheaths smooth, glabrous, scarious and spongy; auricles 10–15 mm long, erect; ligules 15–45 mm long, eciliate membrane, entire, lacerate or acute; blades 10–75 cm long; 5–25 mm wide, linear-lanceolate to very narrowly elliptic, broadest below the middle, bright to dark green, somewhat flaccid, scaberulous, midrib indistinct or evident, margins scabrous, bases narrowed or tapered to a false petiole, apex acuminate. Panicles 16–40 cm long, open, elliptic, or oblong. Spikelets 7–12 mm long, oblong, laterally compressed; principal lemma awn (26–)40–75 mm long. Distribution: tropical and temperate Africa to west Indian Ocean.

127. *Oryza sativa* L.

FIGURE 136

Oryza sativa L., Sp. Pl. 1: 333. 1753.
Common names: *malo;* Asian rice, paddy.

Caespitose annuals. Culms up to 150 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, glabrous, margins smooth; auricles clawlike or erect; ligules up to 10 mm long, membranous, apex lacerate, acute; blades 10–50 cm long, 4–10 mm wide, flat, spreading, straight, scaberulous, glabrous or pubescent, margins scabrous, apex acuminate. Panicles 20–50 cm long, lanceolate, equilateral or nodding. Spikelets 8–11 mm long, 2.5–3.5 mm wide, elliptic or oblong, laterally compressed; lemmas unawned or awned, the awns up to 16 mm long; stamens 6. Distribution: Warm temperate regions.

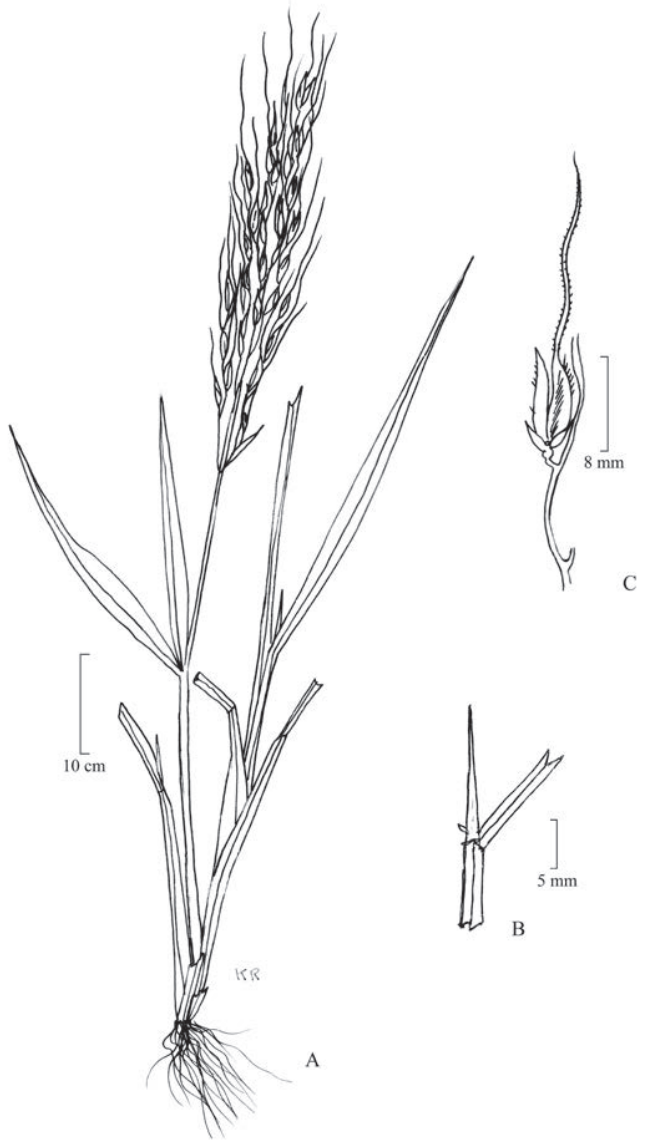


FIGURE 135. *Oryza longistaminata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *B. de Winter 745* (US- 2075887).

128. *Oxytenanthera abyssinica* (A. Rich.) Munro

FIGURE 137

Oxytenanthera abyssinica (A. Rich.) Munro, Trans. Linn. Soc. London 26(1): 127. 1868. [*Bambusa abyssinica* A. Rich.]

Common names*: bo, dianacare, kore*: Bindura bamboo, Holy Venda bamboo, savanna bamboo, wine bamboo.

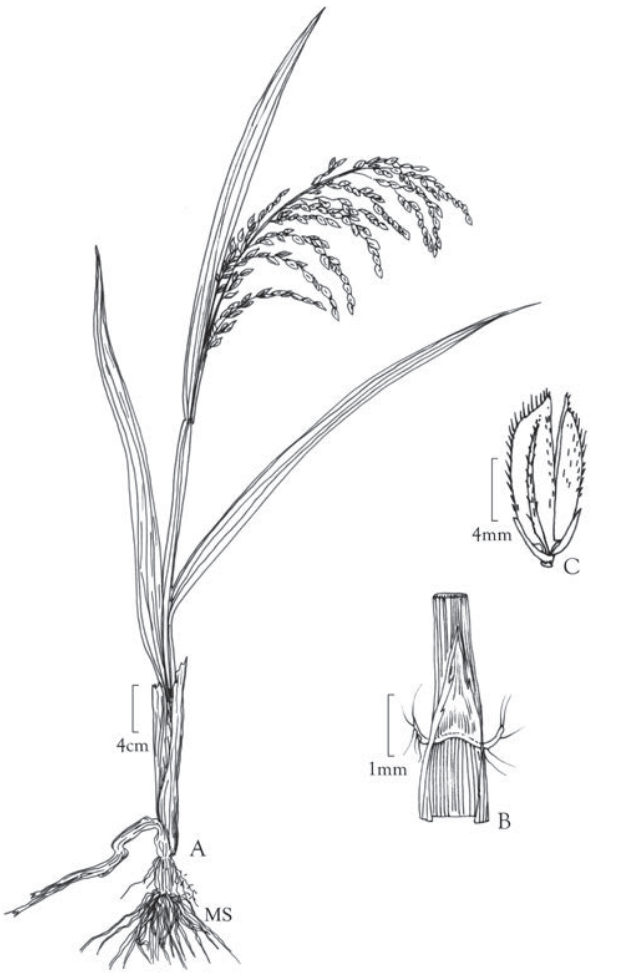


FIGURE 136. *Oryza sativa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *El Hadidi s.n.* (CAI), Ibrahim and Kabuye (1988*);* B, C drawn from *P. Taylor 9367* (US-2461385*).*

Caespitose perennials with short rhizomes. Culms 3–10 m tall, 5–10 cm thick, robust, woody, erect, bamboolike, lateral branches well developed from midculm nodes and above; internodes solid or thick walled, smooth; nodes slightly inflated. Leaves mostly cauline, deciduous; sheaths hispid with with dark brown stiff hairs when young, later glabrous; oral hairs ciliate; ligules eciliate membrane; blades 5–25 cm long, 1–3 cm wide, constricted at base to a petiolelike connection, linear-lanceolate to lanceolate, surfaces glaucous, glabrous or with few appressed hairs below near the midvien, stiff, venation with obscure veins, bases broadly rounded, margins scabrous, apex acuminate, pungent. Inflorescence a dense globose cluster of spikelets 7–9 cm in diameter, each head consisting of several spikelet clusters subtended by papery ovate sheath with reduced blades. Spikelets 15–45 mm long, lanceolate, laterally

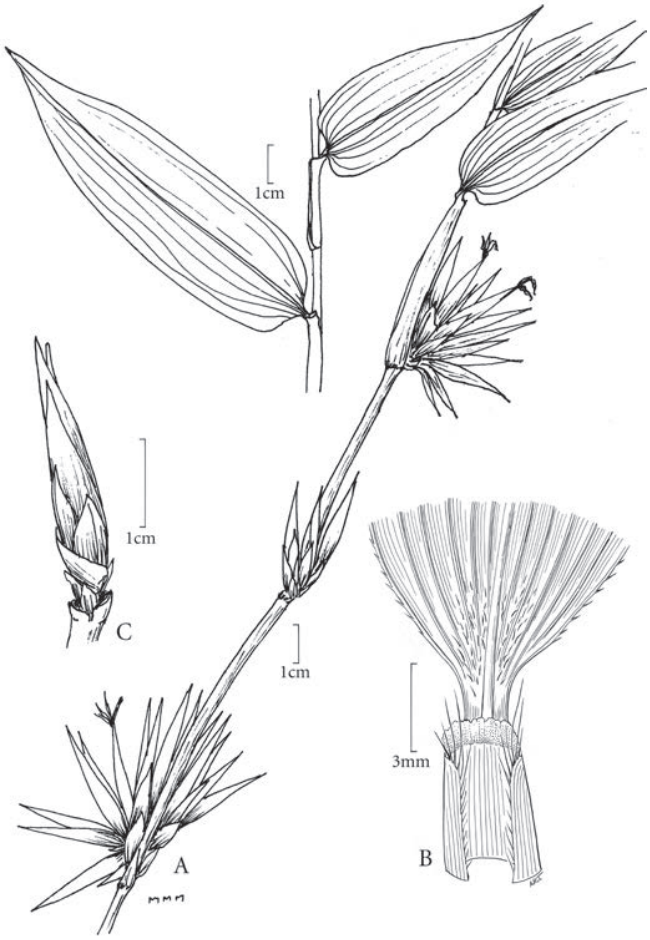


FIGURE 137. *Oxytenanthera abyssinica.* A. Habit B. Ligule, sheath apex, and leaf blade. C Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B. drawn from *N. K. B. Robson 1034* (US-3000875).

compressed; lemma awned, the awns 2–7 mm long. Distribution: tropical Africa.

129. *Panicum anabaptistum* Steud.

FIGURE 138

Panicum anabaptistum Steud., Syn. Pl. Glumac. 1: 75. 1853.
Common names: *iufane, paguiri mayo, suebee*.

Caespitose perennials with short rhizomes. Culms 100–150 cm long, erect, or geniculately ascending, branching; internodes glabrous, smooth, dark. Leaves basal and cauline; sheaths firm, usually glabrous and smooth, rarely hirsute, closely striate; oral hairs sometimes bearded; ligules ciliate membrane; blades 10–30(–40) cm long, 4–6 mm wide, linear, flat, glaucous, glabrous with simple or slightly narrowed base, apex acute. Panicles



FIGURE 138. *Panicum anabaptistum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *F. Seiner 529* (US-733010).

15–30 cm long, oblong. Spikelets 3.6–4.3 mm long, solitary, oblong, dorsally compressed, acuminate; lemma apex obtuse, awnless. Distribution: tropical Africa.

130. *Panicum antidotale* Retz.

FIGURE 139

Panicum antidotale Retz., Observ. Bot. 4: 17. 1786. [*Panicum subalbidum* Kunth]
Common names: blue panic, blue panicum, giant panic grass.

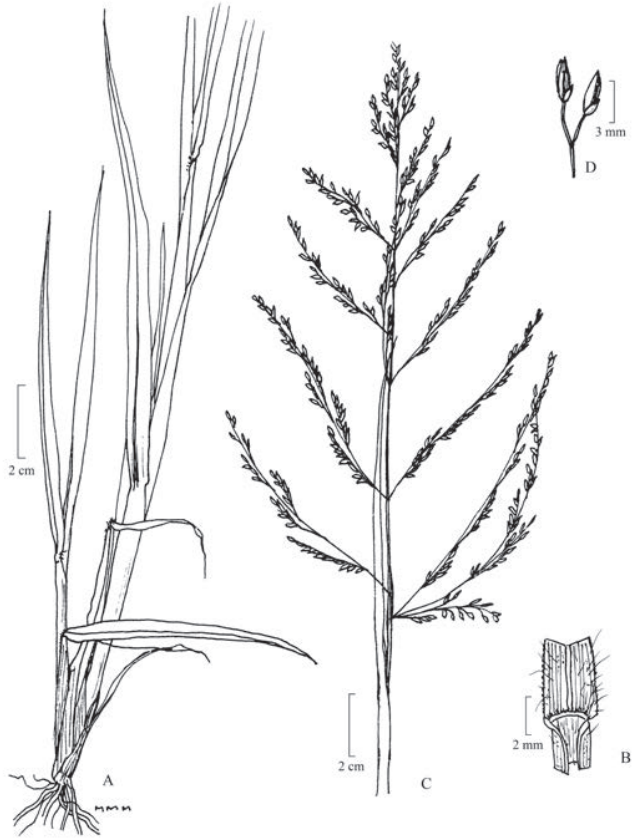


FIGURE 139. *Panicum antidotale.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A drawn from *M. Kassas s.n.* (CAI); B, C drawn from *F. Starr 020201-1* (US-3437456); D modified from Freckman and Lelong (2003).

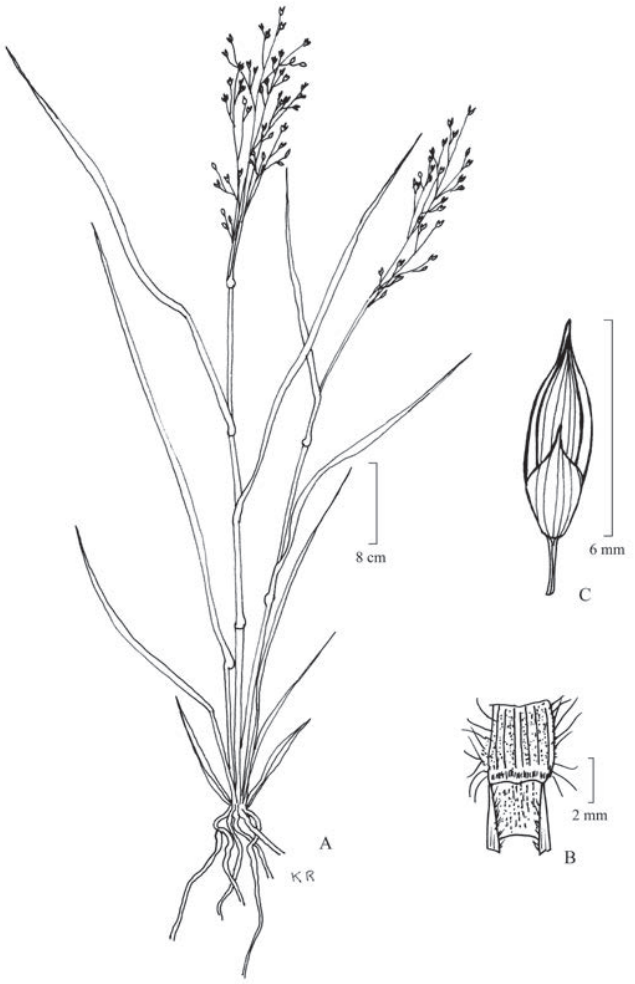


FIGURE 140. *Panicum callosum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *O. Hagerup 481* (US-1718616).

Robust annuals or short-lived perennials. Culms 60–200 cm high, wiry, erect or decumbent; internodes glabrous; lower nodes rooting or not, brown, glabrous; butt sheaths glabrous, papery. Leaves basal and cauline; sheaths glabrous, often purple, ribbed; ligules ciliate membrane; blades 10–60 cm long, 0.7–2 cm wide, linear, flat or involute, glabrous or pilose, ribbed, bases simple or cordate, apex acuminate. Panicles 10–45 cm long, oblong or ovate. Spikelets 2.4–3.4 mm long, solitary, ovate, dorsally compressed, acuminate; lemma apex obtuse, awnless. Distribution: tropical and temperate Africa and western Indian Ocean.

131. *Panicum callosum* Hochst.

FIGURE 140

Panicum callosum Hochst., Schimp. Iter. Abyss. Sectio III, 1713. 1844. [*Panicum nigerense* Hitchc.]

Annuals. Culms 80–100 cm long, erect, robust. Leaves basal and cauline; sheaths hairy; ligules ciliate membrane; blades 5–40 cm long, 0.4–1 cm wide, linear, flat or involute, hairy, apex attenuate. Panicles 15–30 cm long, open, obovate; primary branches 10–20 cm long, whorled at lower nodes, stiff. Spikelets 5–6 mm long, solitary, lanceolate, dorsally compressed, acuminate; lemma apex obtuse, awnless. Distribution: tropical West Africa.

132. *Panicum fluviicola* Steud.

FIGURE 141

Panicum fluviicola Steud., Syn. Pl. Glumac. 1: 89. 1854. [*Panicum aphanoneurum* Stapf]
Common names: *ghonya, gonya*.

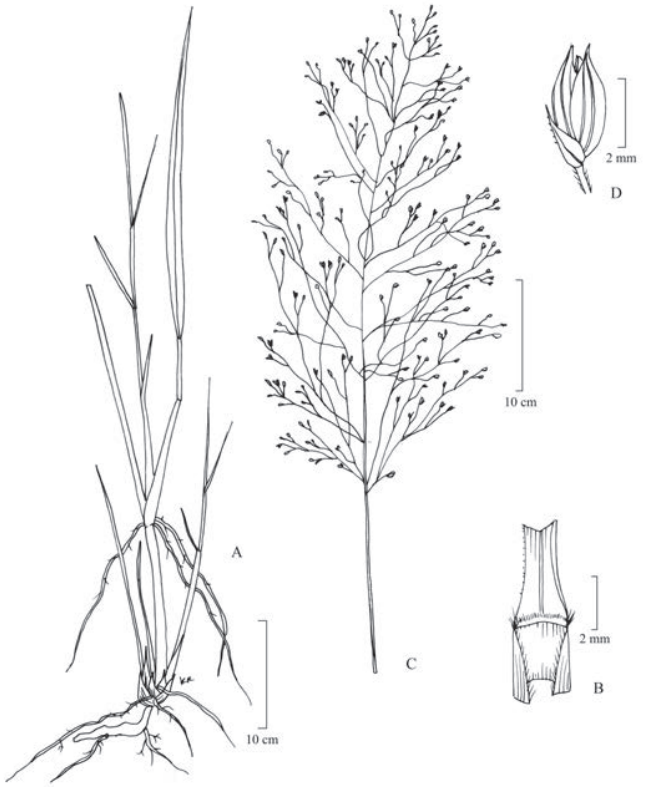


FIGURE 141. *Panicum fluviicola.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. Laegaard 15982* (US-3292316).

Robust to slender, tufted or solitary perennials with short rhizomes. Culms (30–)60–230 cm high, erect; branching sparsely from midculm; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths occasionally hairy, margins ciliate or glabrous, often purple tinged, ligules ciliolate membrane; blades (13–)25–50 cm long, 0.3–1.2 cm wide, linear, flat or partially folded especially toward the base, glabrous or pilose, with an inconspicous greenish-white midrib slightly recessed above and protruding below; apex firm with a hardened point, almost pungent. Panicles 10–45 cm long, open, oblong. Spikelets 2–2.5(–3) mm long solitary, ovate, dorsally compressed; lemma apex obtuse, awnless. Distribution: tropical and temperate Africa.

133. *Panicum laetum* Kunth

FIGURE 142

Panicum laetum Kunth, Révis. Gramin. 2: t. 113. 1831.
Common names: *balbaldi, paguiri*; wild fonio, wild hungry rice, fonio of the birds.



FIGURE 142. *Panicum laetum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *A. Pappi 6045* (US-2874920).

Caespitose or solitary annuals. Culms 17–70 cm long, erect or geniculately ascending; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, rarely pilose; ligules ciliate membrane; blades 4–24 cm long, 0.5–1 cm wide, linear or lanceolate, midrib scabrous, margins scabrid, bases broadly rounded, glabrous, apex acuminate. Panicles 7–20 cm long, open, ovate; primary branches spreading. Spikelets 2.5–3 mm long, solitary, ovate, dorsally compressed, acute; lemma apex obtuse, awnless. Distribution: tropical Africa and western Indian Ocean.

134. *Panicum repens* L.

FIGURE 143

Panicum repens L., Sp. Pl., ed. 2, 1: 87. 1762.
Common names: *bama subu*; couch panicum, torpedo grass, Victoria grass.

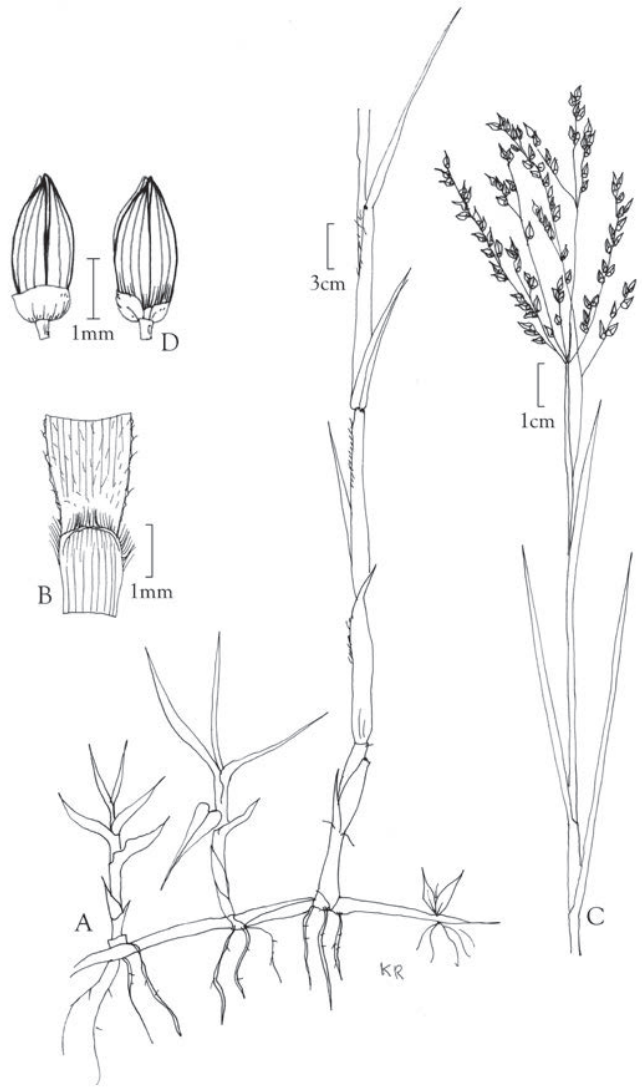


FIGURE 143. *Panicum repens*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (left) and lower (right) glumes. A drawn from *J. Osborn & I. Helmy s.n.* (CAI); B, C drawn from *A. C. Thomas 861* (US-1538900); D modified from Freckman and Lelong (2003).

Caespitose perennials; rhizomes elongated; stolons sometimes present. Culms up to 100 cm tall, erect, often with swollen bulblike base, glabrous; butt sheaths pubescent. Leaves distichous, basal and cauline; sheaths flattened, sparsely hairy, margins woolly at least when young; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 5–20 cm long, 2–6 mm wide, linear, flat or revolute, spreading, stiff, coriaceous, hairy, margins ciliate, apex attenuate and spiny, pungent. Panicles 5–20 cm long, open, oblong. Spikelets 2.5–3 mm long, ovate, dorsally compressed, apex acute; lemmas awnless. Distribution: tropics and subtropics.

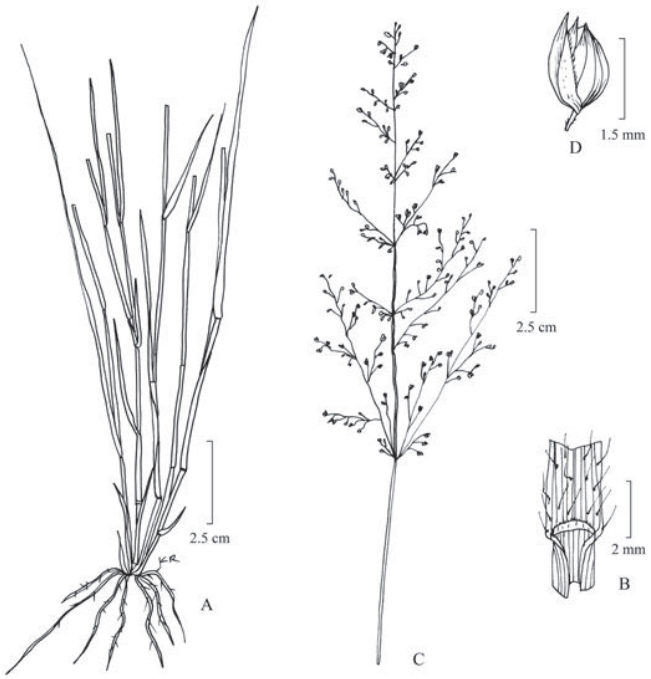


FIGURE 144. *Panicum tenellum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from Poilecot (1999).

135. *Panicum tenellum* Lam.

FIGURE 144

Panicum tenellum Lam., Tabl. Encycl. 1: 173. 1791.

Caespitose annuals. Culms 10–35 cm long, erect, slender; branching ample, often fascicled, arising below. Leaves basal and cauline; sheaths longer than blade, striate glabrous; ligules eciliate membrane; blades 2.5–9 cm long, 1.5–3 mm wide, filiform, flaccid, flat or involute, glabrous, apex acuminate. Panicles 3–11 cm long, open, oblong, or ovate; branches capillary. Spikelets 1–1.5 mm long, solitary, oblanceolate, ovate or orbicular, dorsally compressed; lemma apex obtuse, awnless. Distribution: tropical Africa.

136. *Panicum turgidum* Forssk.

FIGURE 145

Panicum turgidum Forssk., Fl. Aegypt.-Arab. 18. 1775.
Common names: *afazo, afezu*; basket grass, desert grass, Sahara millet.

Caespitose perennial forming rounded bushes; rhizomes elongated. Culms up to 100 cm tall, solid, woody, erect, tough,

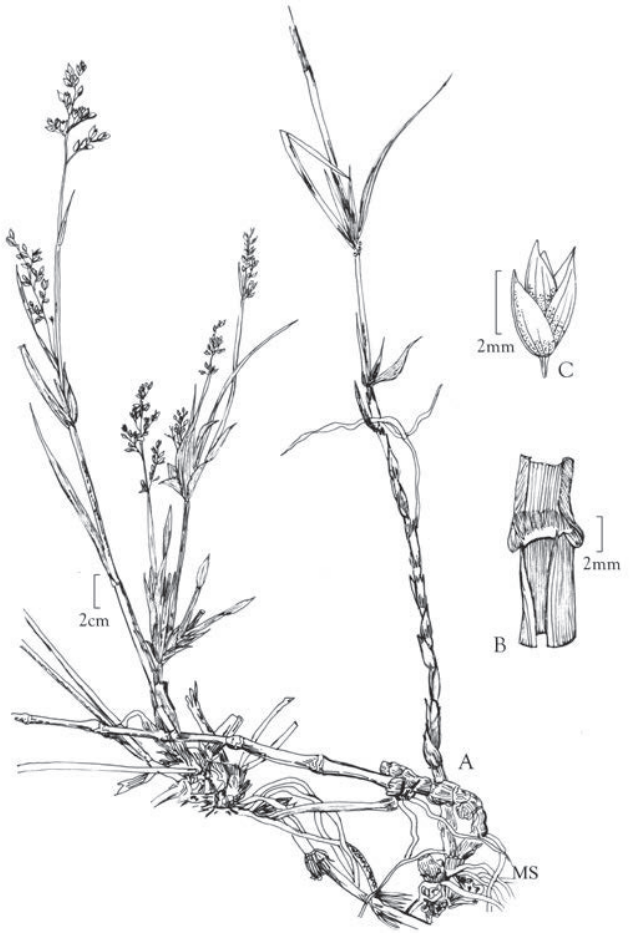


FIGURE 145. *Panicum turgidum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm 644* (CAI); B, C drawn from *G. Schweinfurth 84* (US-823864).

ribbed; internodes glabrous; nodes dark; butt sheaths sparsely hairy. Leaves distichous, glaucous, basal and cauline; sheaths much longer than blades, overlapping, ribbed, glabrous, margins membranous; oral hairs present; ligules ciliate membrane; blades 2–15 cm long, 1–6 mm wide, linear-lanceolate, convolute, spreading, stiff, coriaceous, glabrous, margins smooth, apex spiny, pungent. Panicles 2.5–15(–30) cm long, open, pyramidal. Spikelets (3.1–)3.4–4.5(–5) mm long, ovate, dorsally compressed, falling entire, apex acute or acuminate; lemma awnless. Habitat: sandy soils. Distribution: temperate and tropical Africa and Asia.

137. *Panicum walense* Mez

FIGURE 146

Panicum walense Mez, Bot. Jahrb. Syst. 34(1): 146–147. 1904. [*Panicum humile* Steud.]

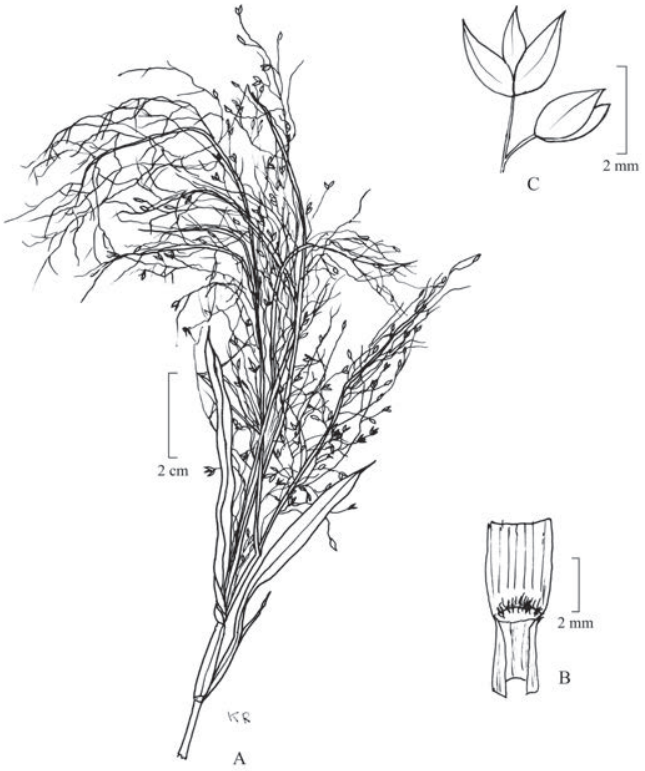


FIGURE 146. *Panicum walense.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *Chevalier 2235* (US-1715361).

Caespitose annuals. Culms 18–70(–90) cm long, erect or geniculate, slender; sometimes quite short; internodes glabrous, smooth, often purplish, branched from all or most nodes, the branches often fascicled. Leaves mosly cauline; sheaths somewhat loose, striate, glabrous except at the upper margins, which are sometimes delicately ciliate; ligules ciliate membrane; blades 7–20 cm long, 2–6 mm wide, flat, flaccid, glabrous, margins scabrous, apex acute or acuminate. Panicles 5–15(–23) cm long, open, embraced at base by subtending leaf, oblong or ovate; primary branches ascending or spreading. Spikelets 1.5–2 mm long, solitary, ovate, dorsally compressed; lemma apex obtuse, awnless. Distribution: Temperate and tropical Africa, western Indian Ocean, and Asia.

138. *Parahyparrhenia annua* (Hack.) Clayton

FIGURE 147

Parahyparrhenia annua (Hack.) Clayton, Kew Bull. 20: 434. 1966 [1967].

Caespitose annuals. Culms 30–160 cm long, erect; with a few branches below. Leaves mostly cauline; sheaths glabrous; auricles 2–5 mm long, erect; ligules 2–5 mm long, eciliate membrane;



FIGURE 147. *Parahyparrhenia annua.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *P. Adames 408* (US-2462148).

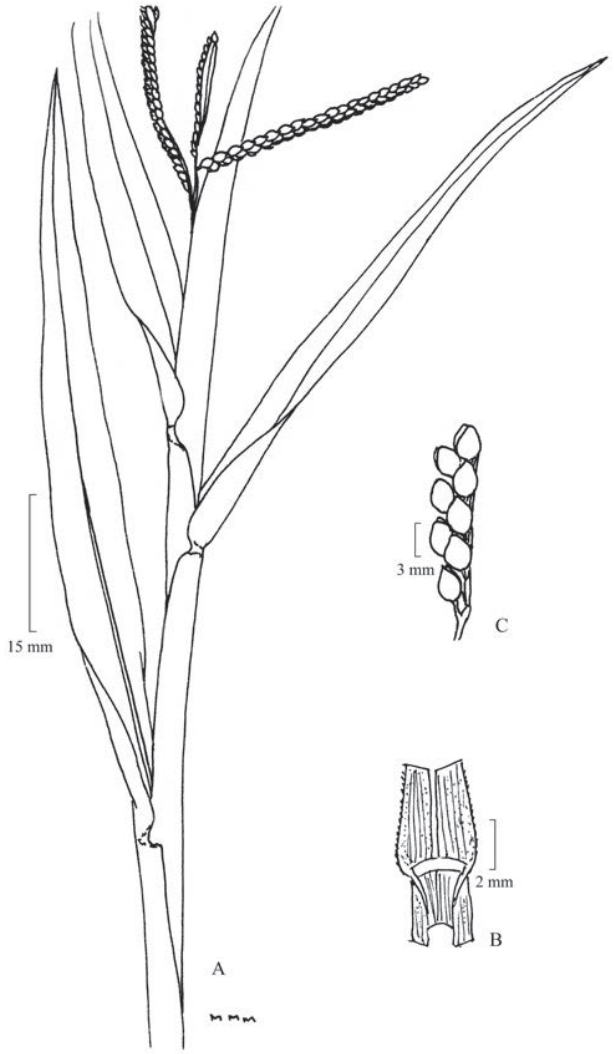


FIGURE 148. *Paspalum scrobiculatum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A and C drawn from Ibrahim and Kabuye (1988). B drawn from Bogdan Collection, NARS, Kitale, Kenya.

blades 5–45 cm long, 1–6 mm wide, filiform with white midribs on lower ⅓, bases slightly or markedly narrowed, spatheolate. Racemes 2–6 cm long, paired or sometimes single. Spikelets in pairs, the basal sterile and the upper fertile. Fertile spikelets 5–11 mm long; callus 1–4 mm long, cuneate, pilose, pungent; lemma apex bidentate, awned; principal lemma awns 35–100 mm long from a sinus, geniculate, column twisted. Distribution: tropical Africa.

139. *Paspalum scrobiculatum* L.

FIGURE 148

Paspalum scrobiculatum L., Mant. Pl. 1: 29. 1767.

Common names: *barobia, parkatari*; Indian crown grass, Indian paspalum, kodo millet, wild paspalum.

Mat-forming, caespitose perennials. Culms 10–150 cm long, erect, or geniculately ascending; with a few branches from mid culm; internodes glabrous; nodes dark, lower nodes rooting or not. Leaves basal and cauline; sheaths mostly shorter than adjacent culm internodes, open, glabrous; ligules eciliate membrane; blades 5–40 cm long, 0.3–1.5 cm wide, linear or linear-lanceolate, flat, glabrous or soft hairy, whitish hyaline midrib recessed above and protruding below on lower ⅓, base simple, rounded, tapering to a filiform-attenuate apex. Racemes 2–15 cm long, 1–20, digitate or borne along a central axis,

unilateral. Spikelets 1.4–3 mm long, solitary, obovate or orbicular, dorsally compressed, plano-convex, obtuse; lemma apex obtuse, awnless. Distribution: tropical Africa, western Indian Ocean, temperate and tropical Asia, Australia, North America, and South America.

140. *Phragmites karka* (Retz.) Trin. ex Steud.

FIGURE 149

Phragmites karka (Retz.) Trin. ex Steud., Nomencl. Bot., ed. 2, 1: 144. 1840. [*Phragmites vallatorius* (L.) Veldkamp]

Solitary perennials; rhizomes elongated. Culms 2–10 m tall, erect, reedlike; internodes glabrous; nodes dark. Leaves cauline; sheaths loose; collar dark; ligules ciliate membrane; blades 30–80 cm long, 1.2–4 cm wide, deciduous, flat, scaberulous below, hardened, apex attenuate. Panicles 30–50 cm long, 10–20 cm wide, open panicle, oblong. Spikelets 9–12 mm long, solitary, laterally compressed; floret callus with hairs 4–8 mm long; bisexual lemmas 8.5–10 mm long, apex acuminate, awnless. Distribution: tropical Africa, temperate and tropical Asia, and Australia.

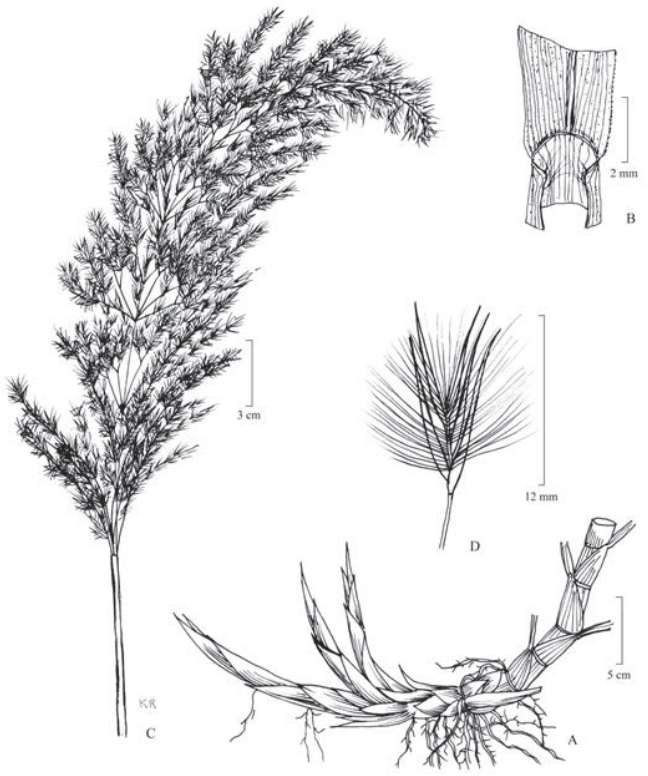


FIGURE 149. *Phragmites karka*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *William Burger 1429* (US- 265188).

141. *Rhytachne rottboellioides* Desv.

FIGURE 150

Rhytachne rottboellioides Desv., Prodr. Pl. Ind. Occid. 12. 1825.

Caespitose perennials. Culms 20–100 cm tall; branches arising from the lower nodes; internodes glabrous; nodes dark; butt sheaths persistent and investing base of culm. Leaves mostly basal; sheath glabrous, the lower ones purplish or white, slightly compressed; ligules ciliolate membrane; blades 5–25 cm long,

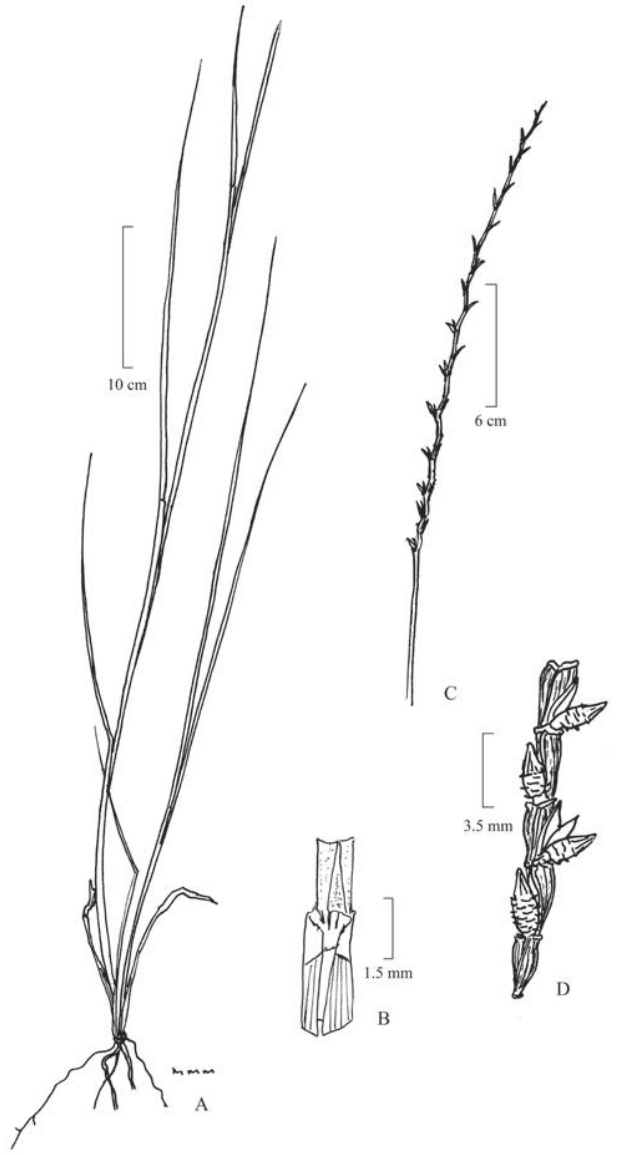


FIGURE 150. *Rhytachne rottboellioides*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

5–10 mm wide, tightly rolled, involute, filiform, margins smooth, apex apiculate. Inflorescence composed of single raceme; racemes 2–20 cm long, smooth, terete. Sessile spikelets 2–5(–6) mm long, oblong, or ovate, dorsally compressed; lower glumes 5–9-veined; lemma apex acute. Distribution: tropical Africa, western Indian Ocean, North America, and South America.

142. *Rhytachne triaristata* (Steud.) Stapf

FIGURE 151

Rhytachne triaristata (Steud.) Stapf, Fl. Trop. Afr. 9: 85. 1917.

Caespitose annuals. Culms 30–80 cm tall, slender, erect; branches arising from the lower nodes; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous; ligules ciliolate membrane; blades 10–20 cm long, 1–2 mm wide, filiform, convolute, puberulous, apex acuminate. Inflorescence composed of single raceme; racemes 5–12 cm long, smooth, terete. Sessile spikelets 5 mm long, oblong, dorsally compressed; lower glumes 6- or 7-veined; lemma apex acute, awnless. Distribution: tropical Africa.

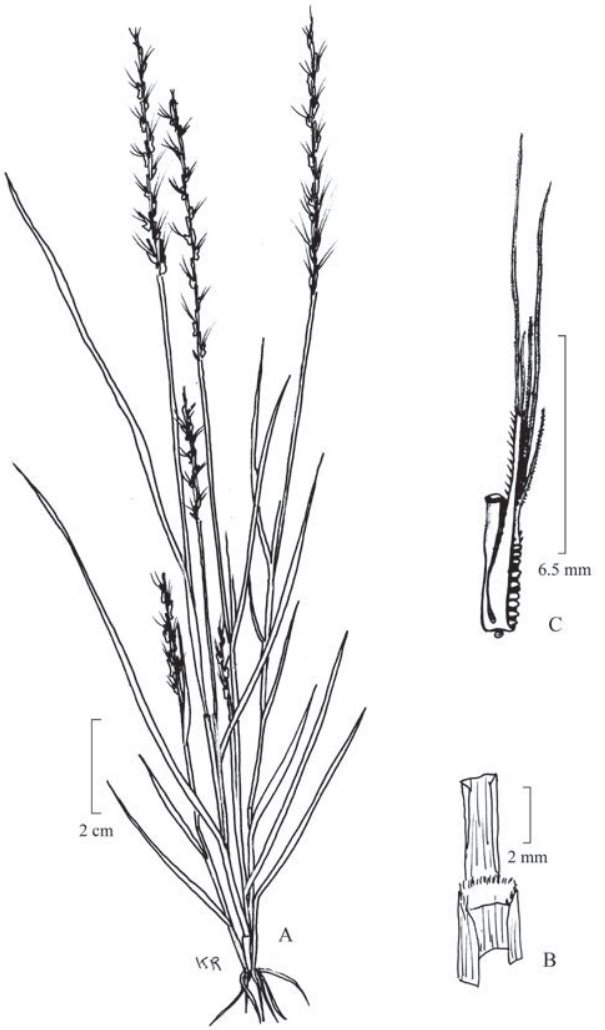


FIGURE 151. *Rhytachne triaristata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *G. A. Mensah 536* (US-2209057).

143. *Rottboellia afraurita* Stapf

FIGURE 152

Rottboellia afraurita Stapf, **Mém. Soc. Bot. France** 55: 98. 1908. [*Coelorachis afraurita* (Stapf) Stapf; *Mnesithea afrautita* (Stapf) de Koning and Sosef]

Caespitose perennials. Culms up to 400 cm tall, robust, erect. Leaves cauline; sheaths keeled, basal ones strongly laterally compressed and flabellate; ligules ciliolate membrane; blades 30–100 cm long or more and 0.4–1.2 cm wide, conduplicate, apex acute. Inflorescences simple raceme embraced below by a spatheole; racemes 2–7 cm long. Spikelets 3–4.5 mm long, in pairs, ovate, dorsally compressed; lemma awnless. Distribution: throughout tropical Africa.

144. *Sacciolepis africana* C. E. Hubb. & Snowden

FIGURE 153

Sacciolepis africana C. E. Hubb. & Snowden, Bull. Misc. Inform. Kew 1936(5): 294. 1936.
Common name: *niepoto*.

Caespitose perennials with short rhizomes. Culms 30–180 cm long, decumbent, spongy; branching from lower nodes; internodes glabrous, ribbed; nodes dark, lower nodes rooting. Leaves basal and cauline; sheaths loose, keeled, striate; collars dark; ligules eciliate membrane; blades 5–40 cm long, 0.3–1.5 cm wide, glabrous, with conspicuous whitish midribs on lower ⅓, apex attenuate. Panicles 4–30 cm long, spiciform, narrow. Spikelets 2.5–3.5 mm long, solitary, elliptic, dorsally compressed, gibbous, obtuse to subacute; lemma apex acute, awnless. Distribution: tropical and temperate Africa and western Indian Ocean.

145. *Sacciolepis chevalieri* Stapf

FIGURE 154

Sacciolepis chevalieri Stapf, Fl. Trop. Afr. 9: 754. 1920.

Densely tufted perennials sometimes with short, oblique rhizomes. Culms 20–100 cm tall, firm, erect, very slender, soft or spongy below; branching from lower nodes; internodes smooth,

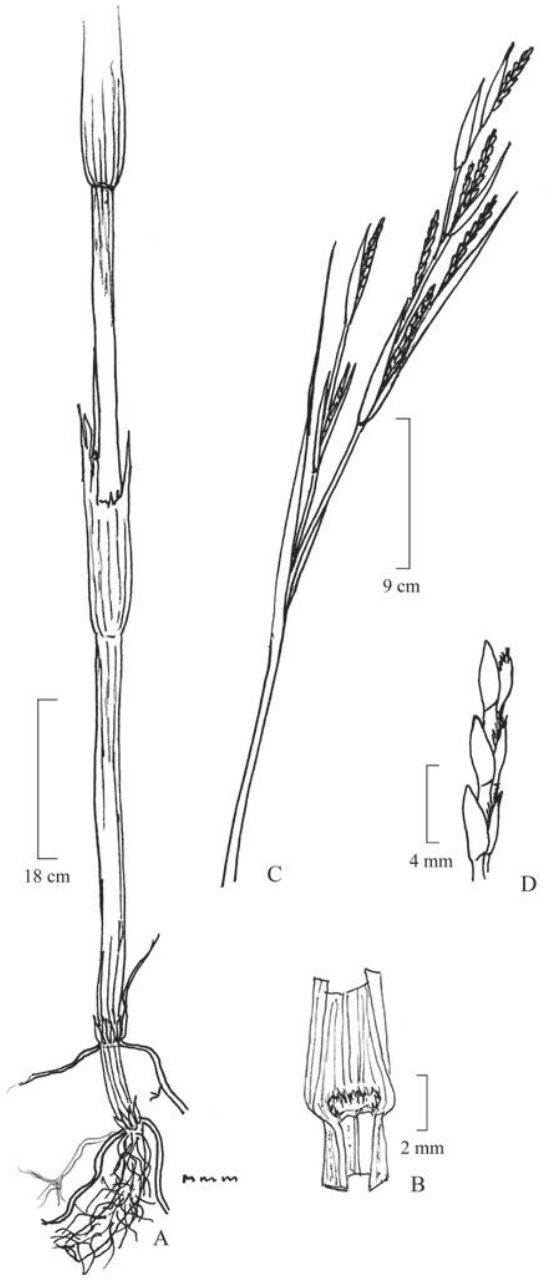


FIGURE 152. *Rottboellia afraurita*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

glabrous, ribbed, semiterete; nodes glabrous; butt sheaths scarious glabrous. Leaves mostly basal; sheaths glabrous; ligules ciliolate membrane; blades 5–20 cm long, 1–7 mm wide, convolute, strongly ribbed, papillose or not, margins smooth, inrolled, bases narrow, apex acuminate. Panicles 2–16 cm long, spiciform, narrow, continuous or interrupted below. Spikelets 1.5–2.2 mm

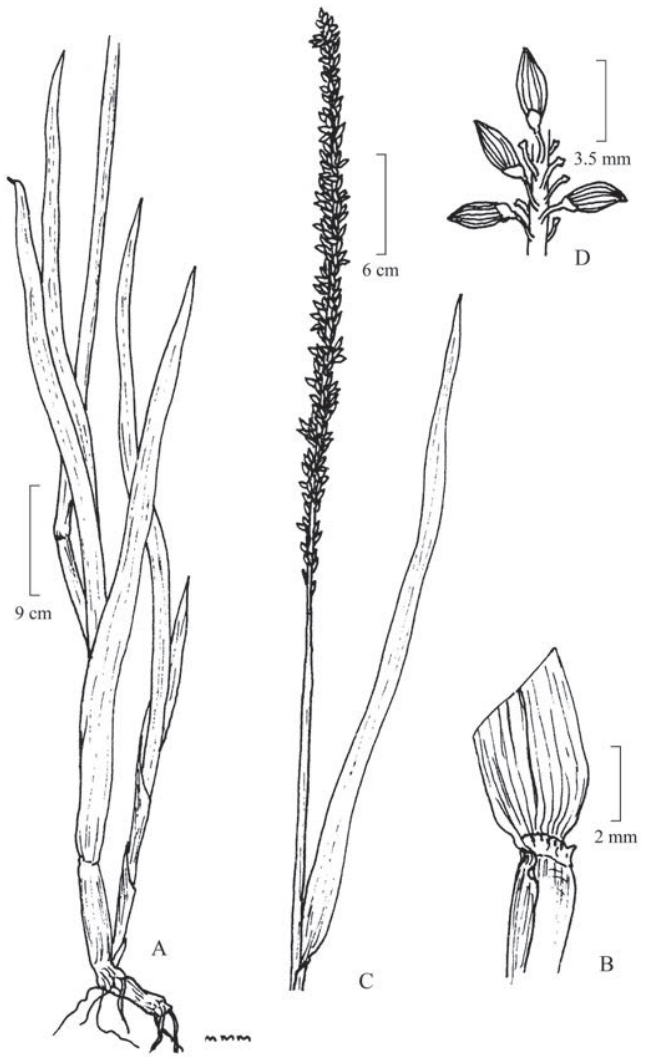


FIGURE 153. *Sacciolepis africana*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from Ibrahim and Kabuye (1988).

long, solitary, ovate, laterally compressed, gibbous; lemma apex obtuse, awnless. Distribution: tropical and temperate Africa and western Indian Ocean.

146. *Sacciolepis micrococca* Mez

FIGURE 155

Sacciolepis micrococca Mez, Repert. Spec. Nov. Regni Veg. 15: 122. 1918.

Caespitose annuals. Culms 15–70 cm tall, erect, wiry; internodes glabrous, striate; nodes dark. Leaves basal and cauline;

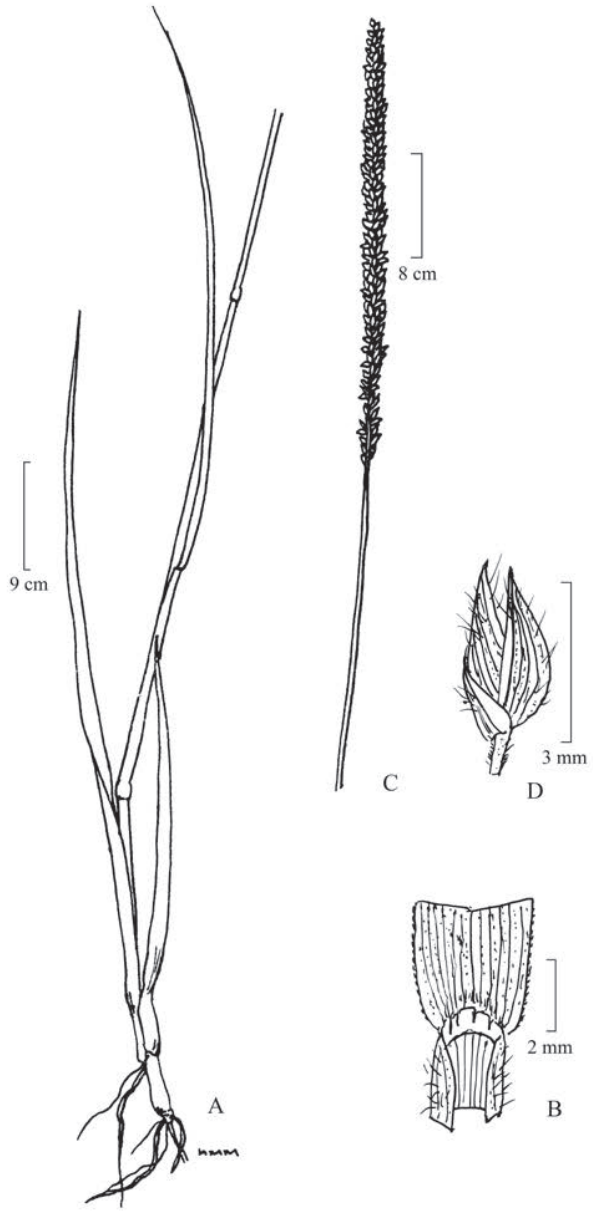


FIGURE 154. *Sacciolepis chevalieri.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988). B drawn from *E. Milne-Redhead* & *P. Taylor 9559* (US-2841886).

sheaths open, glabrous, ribbed; oral hairs bearded; ligules ciliolate membrane; blades 4–15 cm long; 1–2 mm wide, filiform, conduplicate, glabrous, papillose on veins above, bases narrower than sheath apex, apex acuminate. Panicles 2–15 cm long, spiciform, narrow. Spikelets 0.7–1 mm long, solitary, elliptic, slightly laterally compressed; lemma apex obtuse, awnless. Distribution: tropical and temperate Africa and western Indian Ocean.



FIGURE 155. *Sacciolepis micrococca.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *E. Milne-Redhead & P. Taylor 9911* (US-2841889), *M. McCallum Webster s.n.* (US-2464189).

147. *Schizachyrium brevifolium* (Sw.) Buse

FIGURE 156

Schizachyrium brevifolium (Sw.) Buse, Pl. Jungh. 359. 1854.

Caespitose annuals, often reddish in color. Culms 5–60 cm long; 1–2 mm in diameter, geniculate or prostrate, slender, weak; branching near the base; internodes glabrous, striate. Leaves basal and cauline; sheaths mostly shorter than adjacent internodes, keeled; ligules ciliolate membrane; blades 1–6 cm long, 1–7 mm wide, linear or linear-lanceolate flat, apex obtuse. Inflorescence composed of a single raceme, terminal and axillary;



FIGURE 156. *Schizachyrium brevifolium.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

racemes 1–2.5 cm long, subtended by a linear spatheole. Spikelets 1–1.5 mm long, in pairs, lanceolate, dorsally compressed; lemma apex entire (when awnless), or lobed, bidentate, incised 0.9 of lemma length, muticous (rarely) or awned; principal lemma awns 7–12 mm long from a sinus, geniculate, column twisted, glabrous. Distribution: tropical and temperate Africa, western Indian Ocean, temperate and tropical Asia to Western Hemisphere.

148. *Schizachyrium exile* (Hochst.) Pilg.

FIGURE 157

Schizachyrium exile (Hochst.) Pilg., Bot. Jahrb. Syst. 54: 284. 1917. Common name: red grass.

Loosely caespitose annuals, commonly reddish in color. Culms 10–120 cm tall, erect; with a few branches from the mid

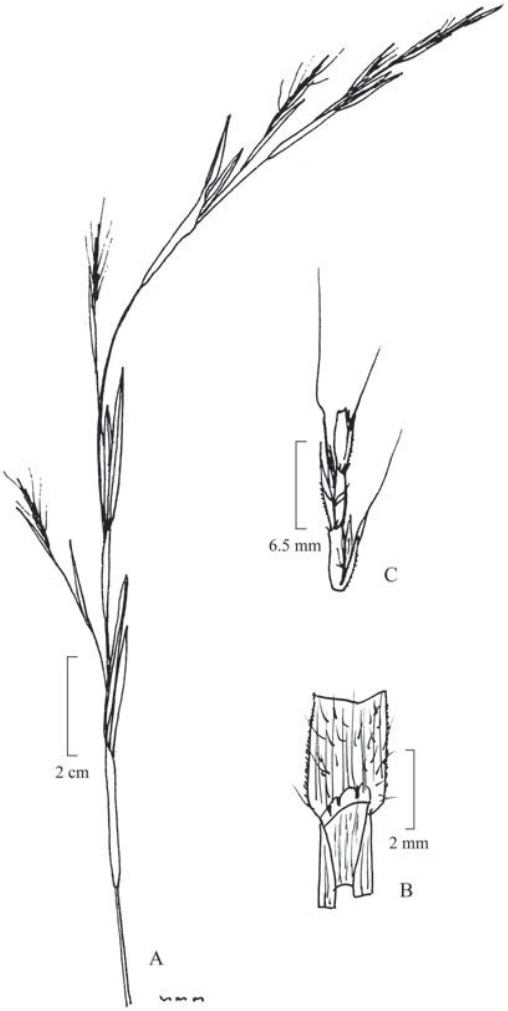


FIGURE 157. *Schizachyrium exile.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from *S. Laegaard* with *T. Sobere 17872* (US-3595169).

culms; internodes glabrous, with occasional prop roots below; roots fine, whitish. Leaves basal and cauline; sheaths much shorter than the internodes, glabrous, lower leaves strongly compressed, keeled toward apex; ligules ciliolate membrane; blades 2–15 cm long, 1–4 mm wide, glabrous or hairy on lower ⅓, with inconspicuous midribs above and protruding below, apex acute. Inflorescence composed of a single raceme, terminal and axillary; racemes 3–6 cm long, subtended by a linear or lanceolate, reddish spatheole. Spikelets 1–2(–3) mm long, in pairs, lanceolate, dorsally compressed; lemma apex lobed, bidentate, incised 0.75 of lemma length, awned; principal lemma awns (7–)10–25 mm long from a sinus, geniculate, column twisted, glabrous. Distribution: tropical and temperate Africa, western Indian Ocean, and tropical Asia.

149. *Schizachyrium gresicola* Jacq.-Fél.

FIGURE 158

Schizachyrium gresicola Jacq.-Fél., Rev. Int. Bot. Appl. Agric. Trop. 33: 446. 1953.

Caespitose perennials, reddish in color; basal innovations flabellate. Culms 20–60 cm long; 1–1.5 mm in diameter, erect; internodes glabrous; nodes dark. Leaves basal and cauline; sheaths compressed, outer margins hairy; ligules 1 mm long, eciliate membrane; blades 10–15 cm long, 5–10 mm wide, filiform, convolute, apex acuminate. Inflorescences composed of single raceme, terminal and axillary; racemes 1–3.5 cm long, flexuous, subtended by a spatheole; spatheoles about 3 cm long, linear; peduncles 3–6 cm long. Spikelets 3.5–4 mm long, in pairs, dorsally compressed; lemma apex bidentate, incised 0.1–0.33 of lemma length, awned; principal lemma awns 12–15 mm long from a sinus, geniculate, column twisted, glabrous. Distribution: tropical West Africa.

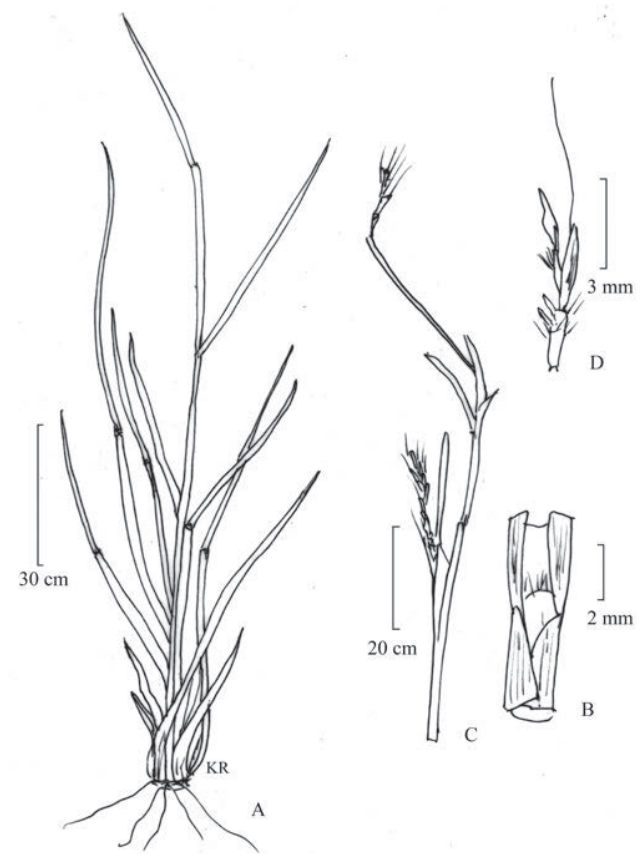


FIGURE 158. *Schizachyrium gresicola*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *A. Pitot s.n.* (K).

150. *Schizachyrium nodulosum* (Hack.) Stapf

FIGURE 159

Schizachyrium nodulosum (Hack.) Stapf, Fl. Trop. Afr. 9: 194. 1917.

Caespitose annuals, reddish in color. Culms 15–45 cm long, erect, slender, solitary or fascicled, usually branched from the middle upward; internodes glabrous or pubescent below the nodes; nodes bearded or not. Leaves basal and cauline; sheaths somewhat loose, the lowest compressed and keeled, glabrous or very sparingly pubescent; ligules eciliate membrane, truncate; blades 3–8 cm long, 2–3 mm wide, narrowly linear, flat or folded, glabrous or sometimes with scattered long hairs near the junction with the sheaths, midribs indistinct, eventually drying white or reddish, margins slightly scabrid, apex acuminate. Inflorescence composed of single raceme, terminal and axillary;

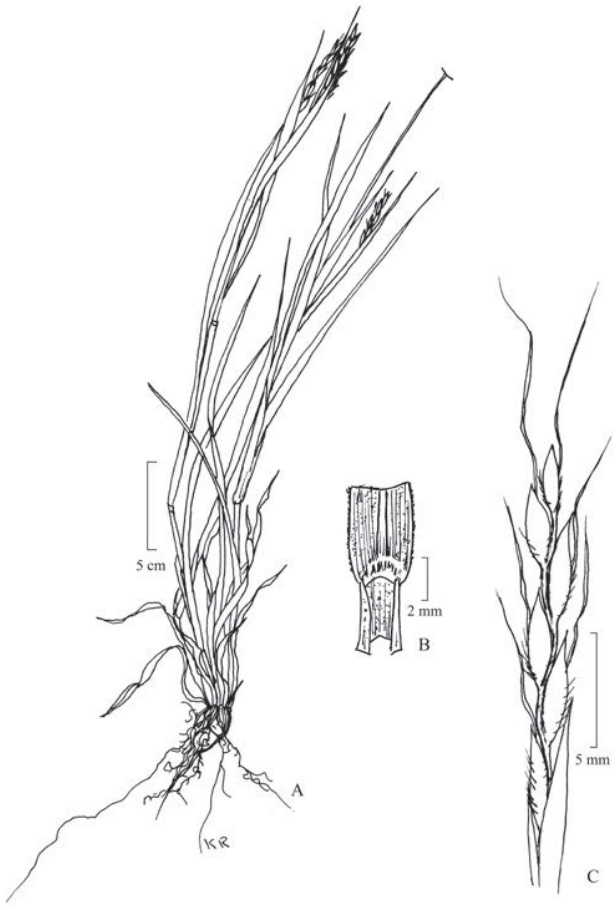


FIGURE 159. *Schizachyrium nodulosum*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *G. Fotius 2226* (US-2841898).

racemes 2.5–5 cm long, smooth, terete, subtended by a spatheole; spatheoles 2.5–3 cm long, lanceolate, red. Spikelets 3 mm long, in pairs, lanceolate, dorsally compressed; lemma apex bidentate, incised 0.6–0.75 of lemma length, awned; principal lemma awns 10–12 mm long from a sinus, geniculate, column twisted, glabrous. Distribution: tropical West Africa.

151. *Schizachyrium ruderale* Clayton

FIGURE 160

Schizachyrium ruderale Clayton, Kew Bull. 19: 451. 1965.



FIGURE 160. *Schizachyrium ruderale.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from Poilecot (1995).

Caespitose annuals. Culms 150–200 cm long, 3–4 mm in diameter near base, erect, reddish in color; often prop-rooted from lower nodes, the roots whitish. Leaves basal and cauline; sheaths glabrous toward the base, hairy toward apex; ligules ciliolate membrane; blades 10–25 cm long, 3–6 mm wide, flat to partially folded, glabrous or pilose, sparsely hairy, hyaline midribs recessed above and protruding below, apex acute. Inflorescence composed of single raceme, terminal and axillary; racemes 5–7 cm long, subtended by a spatheole; spatheoles about 3 cm long, linear, brown, or purple. Spikelets about 4.5 mm long, in pairs, lanceolate, dorsally compressed; lemma apex lobed, bidentate, incised 0.9 of lemma length, awned; principal lemma awns 14–20 mm long from a sinus, geniculate, column twisted. Distribution: tropical West Africa.

152. *Schizachyrium rupestre* (K. Schum.) Stapf

FIGURE 161

Schizachyrium rupestre (K.Schum.) Stapf, Fl. Trop. Afr. 9: 204. 1918.



FIGURE 161. *Schizachyrium rupestre.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

Caespitose perennials. Culms 90–150 cm long, slender, erect; internodes glabrous, reddish in color; roots fairly coarse and distinctively black. Leaves basal and cauline; sheaths firm, the lower compressed, keeled, dark brown, more or less hirsute, the upper usually a few loose hairs upward, finely striate, margins hairy; ligules ciliolate membrane, scarious; blades 15–30 cm long, 1–5 mm wide, folded or sometimes flat, keeled, glabrous except for a few hairs near the base, slightly glaucous when young, turning brown when old, slightly scaberulous above and on the margins, apex acute. Inflorescence composed of a single raceme, terminal and axillary; racemes 3–5 cm long, subtended by a linear spatheole. Spikelets 3–6.5 mm long, appressed, in pairs, lanceolate, dorsally compressed. Distribution: tropical and temperate Africa.

153. *Schizachyrium sanguineum* (Retz.) Alston

FIGURE 162

Schizachyrium sanguineum (Retz.) Alston, Handb. Fl. Ceylon 6: 334. 1931.
Common names: crimson false bluestem, red autumn grass.

Caespitose perennials. Culms 70–300 cm high, reddish-purple, erect, slender; branching from lower nodes; butt sheaths glabrous or rarely sparsely pubescent. Leaves basal and cauline; sheaths glabrous, basal ones compressed; ligules ciliolate membrane; blades 6–30 cm long, 2–9 mm wide, apex acute. Inflorescence composed of single raceme, terminal and axillary; racemes 2–15(–20) cm long, subtended by a spatheole, exserted; spatheoles 4–7 cm long, linear, herbaceous. Spikelets 5–10 mm long, in pairs, laterally compressed. Distribution: tropics, worldwide.

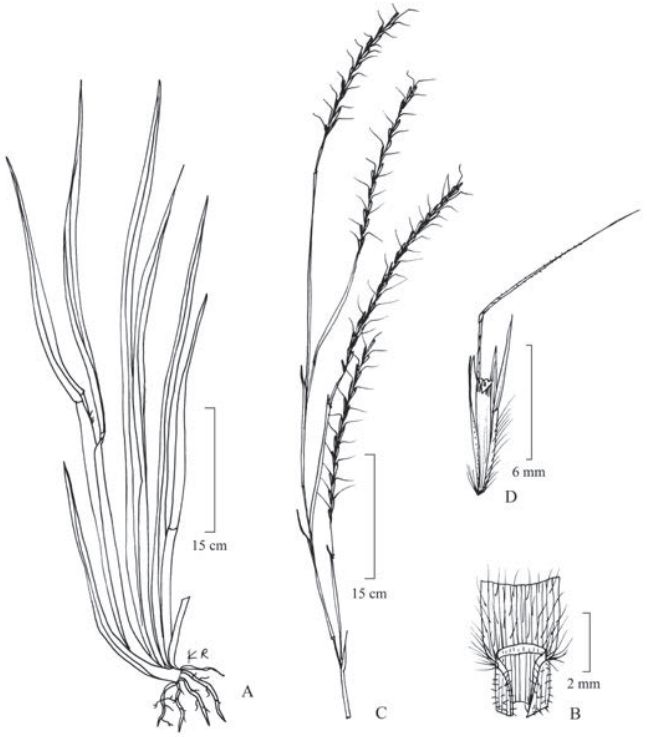


FIGURE 162. *Schizachyrium sanguineum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

154. *Schoenefeldia gracilis* Kunth

FIGURE 163

Schoenefeldia gracilis Kunth, Révis. Gramin. 1: 283. 1830.
Common names: *burdi, furala, urga*.

Caespitose annuals. Culms 20–80 cm tall, erect, geniculate, or decumbent, weak; internodes glabrous; butt sheaths

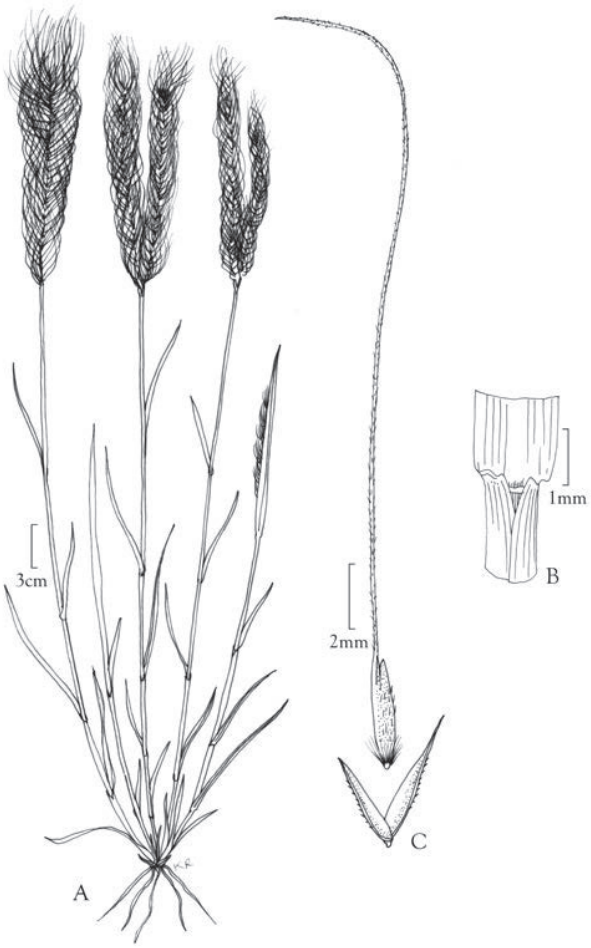


FIGURE 163. *Schoenefeldia gracilis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A modified from Cope (2005); B, C drawn from *W. Burger 3525* (US-2594202).

glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, collar white, margins membranous; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 1–10 cm long, 2–3 mm wide, filiform, convolute with a distinct constriction midlength, ascending, hairy on basal ⅓, margins scabrous, apex attenuate. Racemes 6–15 cm long, 1–4, digitately inserted, curved, unilateral; rachis flattened. Spikelets 3–5 mm long, laterally compressed, cuneate; upper glume often mucronate; lemmas 1.5–2.5 mm long, 3-veined, awned, the awns 10–30(–40) mm long, flexuous, bristly. Distribution: tropical Africa, Arabia to Pakistan, and India.

155. *Sehima ischaemoides* Forssk.

FIGURE 164

Sehima ischaemoides Forssk., Fl. Aegypt.-Arab. 178. 1775.
Common name: *allomoze*.

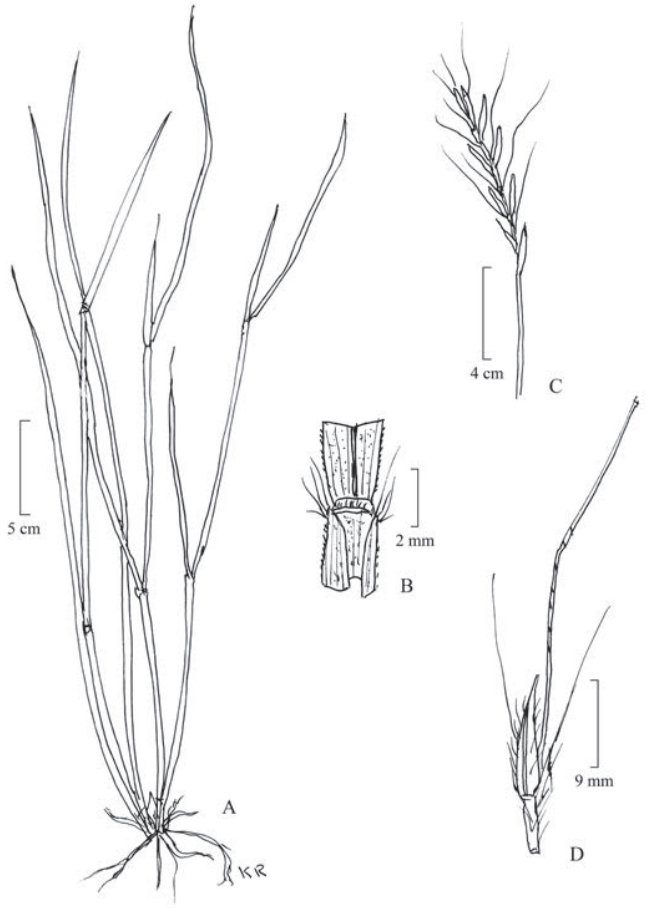


FIGURE 164. *Sehima ischaemoides*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from Poilecot (1999); B, D drawn from Ibrahim and Kabuye (1988).

Caespitose annuals. Culms 20–60 cm long, geniculately ascending, slender; branching from lower nodes; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous; ligules fringe of hairs; blades 5–30 cm long, 1–3 mm wide, flat, glaucous, margins cartilaginous, bases narrower than sheath, apex long-acuminate. Inflorescence a single raceme; racemes 3–15 cm long, straight or arcuate. Spikelets 9–15 mm long, in pairs, laterally compressed. Lemma apex bidentate, bifid; incised 0.25 of lemma length, awned; principal lemma awns 40–70 mm long from a sinus, geniculate, column twisted, ciliate. Distribution: tropical and temperate Africa and Asia.

156. *Setaria barbata* (Lam.) Kunth

FIGURE 165

Setaria barbata (Lam.) Kunth, Révis. Gramin. 1: 47. 1829.
Common names: bristly foxtail grass, corn grass, marvet.

Loosely caespitose annuals. Culms 10–150(–200) cm tall, with a few branches below; internodes ribbed; lower nodes

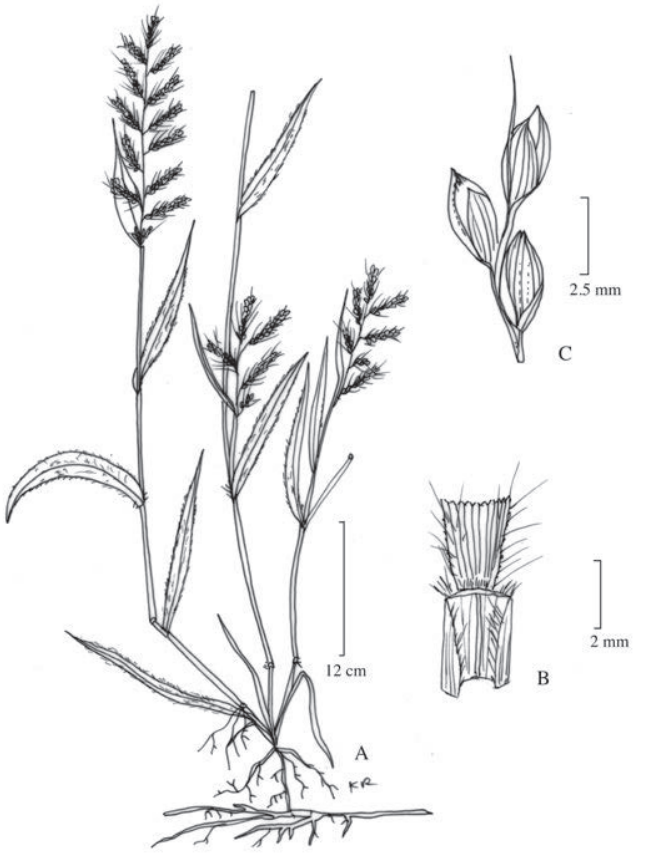


FIGURE 165. *Setaria barbata*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *Carvalho 4152* (US-3328392).

somtines rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, slightly hairy at the apex, margins hairy; collars ciliate; ligules ringe of hairs; blades 5–30 cm long, 0.5–2(–3) cm wide, broadly linear to narrowly lanceolate, distinctively pleated fanwise from the base, dark green, hairy above with white midribs on lower ½, apex acuminate. Panicles 3–25 cm long, open, elliptic primary branches with secondary branches tightly appressed and contracted. Spikelets 2–3.2 mm long, elliptic, dorsally compressed, subtended by an involucre of bristles; bristles 1–15 mm long; lemma apex apiculate. Distribution: tropical and temperate Africa, Asia, Australia, and South America.

157. *Setaria geminata* (Forssk.) Veldkamp

FIGURE 166

Setaria geminata (Forssk.) Veldkamp, Blumea 39(1–2): 377. 1994. [*Paspalidium geminatum* (Forssk.) Stapf]
Common name: Egyptian panic grass.

Mat-forming perennials with elongated, spongy rhizomes. Culms 10–150 cm high, spongy, prostrate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous, scarious. Leaves basal and cauline; sheaths glabrous, keeled, margins smooth; collars white; ligules fringe of hairs; blades 3–25 cm long, 1–3 mm wide, flat or conduplicate, wiry, spreading, stiff, ribbed, scabrous with midrib apparent lower ⅓, margins smooth, bases cordate, apex acuminate, setaceous. Racemes 0.5–4 cm long, borne along a central axis, appressed, unilateral subtended by inflated leaf sheath, embraced at base by subtending leaves. Spikelets 1.6–2.6 mm long, ovate, dorsally compressed; lemmas awnless. Distribution: Old World tropics, western Indian Ocean, North America, and South America.

158. *Setaria pumila* (Poir.) Roem. & Schult.

FIGURE 167

Setaria pumila (Poir.) Roem. & Schult., Syst.Veg. 2: 891. 1817.
Common names: *laki davangel, ulu ndenku*; yellow foxtail.

Solitary annuals. Culms up to 130 cm tall, erect, geniculate, robust, ribbed; nodes dark, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; collars dark; ligules 1–2 mm long, ciliolate membrans or fringe of hairs; blades 2–30 cm long, 2–5(–10) mm wide, linear-lanceolate, loosely twisted, spreading, flaccid, glabrous, margins scabrous, apex acute. Panicles 1–10(–20) cm long, spiciform, terminal, ovate, gibbous. Spikelets 1.5–3.5 mm long, pediceled, dorsally compressed, subtended by an involucre of 4–12 bristles; bristles 3–8 mm long, antrorsely scabrous; lemmas awnless. Distribution: tropical and warm temperate Old World.

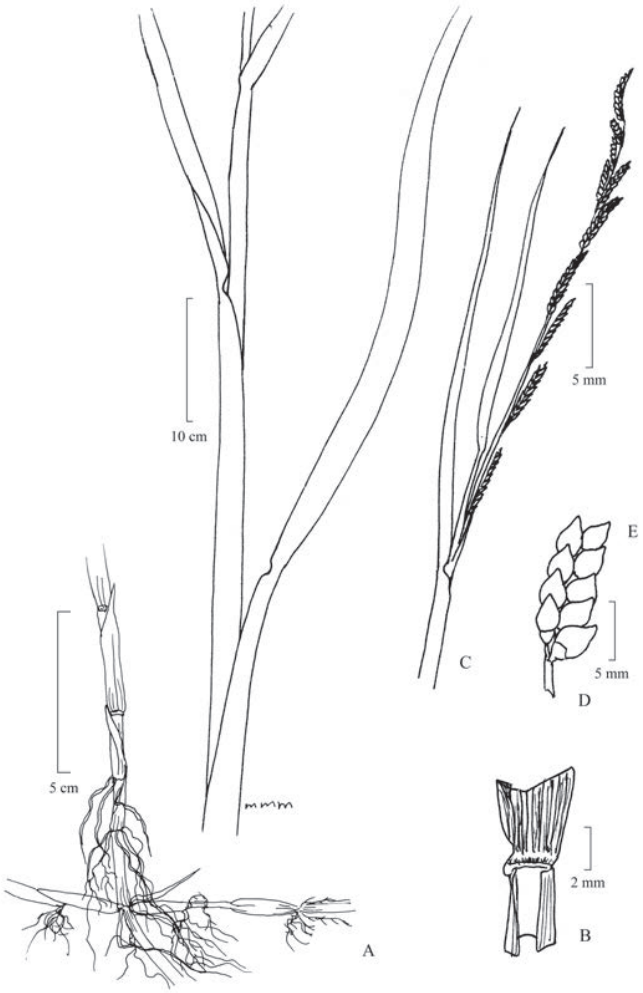


FIGURE 166. *Setaria geminata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A drawn from *M. Hassib s.n.* (CAI); B drawn from *A. Pappi 3209* (US-2686306); C drawn from *Abd El-Ghani 4109* (CAI); D modified from Allen (2003).

159. *Setaria sphacelata* var. *anceps* (Stapf) Veldkamp

FIGURE 168

Setaria sphacelata var. *anceps* (Stapf) Veldkamp, Blumea 39(1–2): 382. 1994. [*Setaria sphacelata* var. *serícea* (R. E. Massey ex Stapf) Clayton]

Caespitose perennials with short or rarely elongated rhizomes. Culms 20–300 cm long, 3–6 mm in diameter, erect or geniculate; a few branches from mid culm; internodes glabrous, ribbed; nodes dark, glabrous; butt sheaths withering or

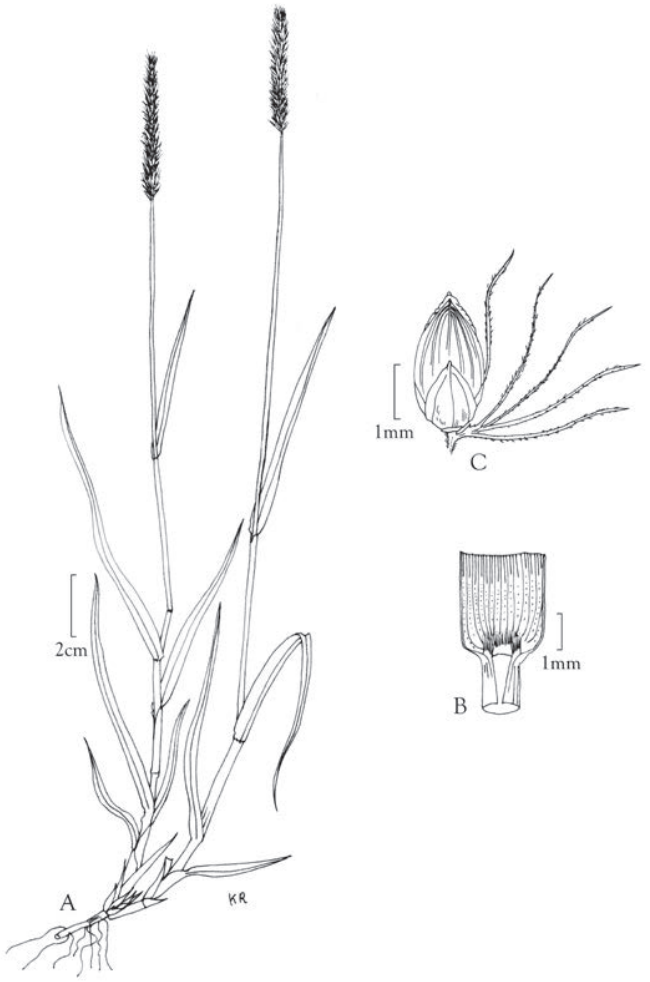


FIGURE 167. *Setaria pumila.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. Kanal 753* (US-3268326); C modified from Rominger (2003).

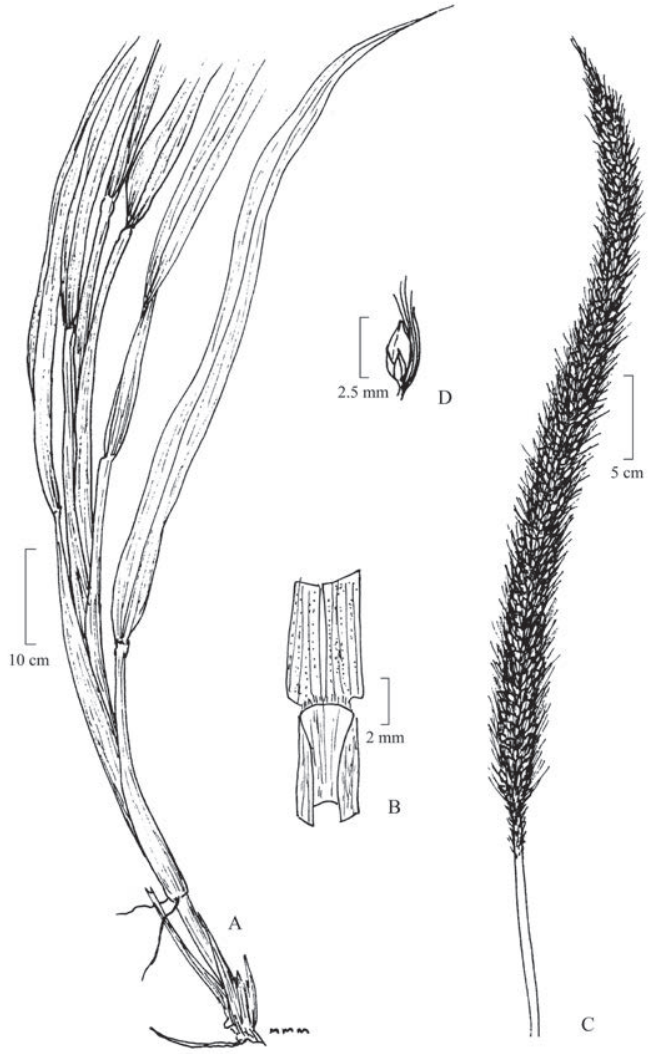


FIGURE 168. *Setaria sphacelata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from Ibrahim and Kabuye (1988).

persistent and investing base of culm with fibrous dead sheaths. Leaves basal and cauline; sheaths rather firm, the lower and those supporting branches soon loosened, laterally compressed, acutely keeled, glabrous or rarely loosely to densely hairy and tuberculate, finely striate; oral hairs present, ligules a fringe of hairs; blades 10–50 cm long, 0.2–1.7 cm wide, flat or convolute, scabrous, bases slightly narrowed, apex acuminate. Panicles 3–50 cm long, spiciform, narrow. Spikelets 1.5–12 mm long, subtended by an involucre of 6–15 bristles, the bristles 1.5–12 mm long, antrorsely scaberulous; lemma apex acute, awnless. Distribution: tropical and temperate Africa, western Indian Ocean, Asia, Australia, and Western Hemisphere.

160. *Setaria verticillata* (L.) P. Beauv.

FIGURE 169

Setaria verticillata (L.) P. Beauv., Ess. Agrostogr. 51. 1812.
Common names: *nornaba*; burr, burr bristle grass, foxtail grass, rough bristle grass.

Caespitose annuals. Culms 30–100 cm tall, erect, geniculate; internodes glabrous, robust, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened,

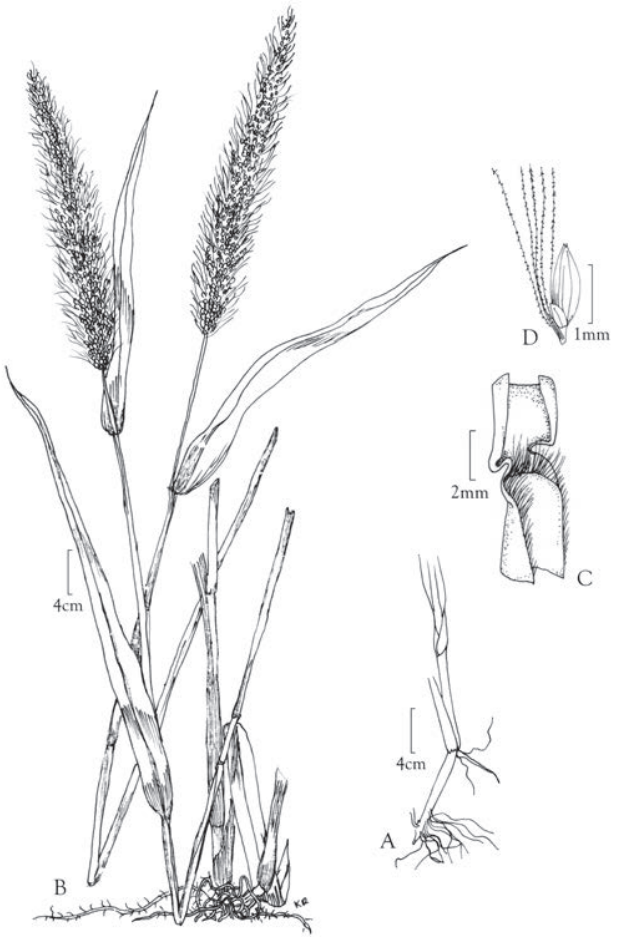


FIGURE 169. *Setaria verticillata.* A. Basal culm. B. Habit. C. Ligule, sheath, and blade. D. Spikelet. A modified from Ibrahim and Kabuye (1988); B–D drawn from *L. F. Ward s.n.* (US-825057).

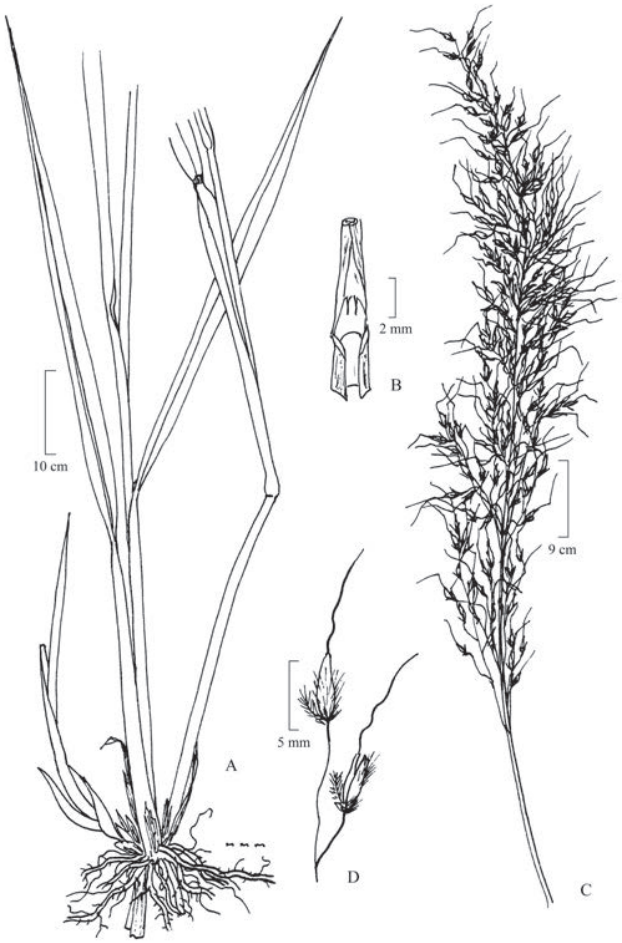


FIGURE 170. *Sorghastrum stipoides.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *M. Reekmans 10218* (US-3595241).

sparsely hairy, ribbed, margins hairy; ligules ciliolate membrane; blades 3–30 cm long, 4–10(–15) mm wide, broadly linear, flat, spreading, flaccid, scabrous, collar white and distinct, margins scabrous, apex acute. Panicles 2–15 cm long, 0.5–1.5 cm wide, spiciform, linear, continuous or interrupted. Spikelets 1.5–2.5 mm long, elliptic, dorsally compressed, pedicelled, each spikelet subtended by a solitary bristle, the bristles 4–7 mm long; lemmas awnless. Habitat: a weed of cultivation. Distribution: temperate and warm temperate regions Old World.

161. *Sorghastrum stipoides* (Kunth) Nash

FIGURE 170

Sorghastrum stipoides (Kunth) Nash, N. Amer. Fl. 17: 129. 1912. Common name: needle Indiangrass.

Caespitose perennials with hard, creeping, short rhizomes. Culms 90–200 cm tall, erect, usually unbranched; internodes glabrous; nodes bearded. Leaves mostly cauline; sheaths glabrous; auricles erect or absent; ligules 1.5–4 mm long, eciliate membrane; leaf-blades 15–50 cm long, 0.3–0.7(–1.2) cm wide, linear-lanceolate, flat or convolute, stiff, rigid and conspicuously narrowed toward the base, glabrous. Panicles 15–40 cm long, open, linear-lanceolate; branches capillary. Spikelets 4–6(–6.5) mm long, in pairs, lanceolate, dorsally compressed; callus rounded, shortly bearded; lemma apex bilobed, incised 0.2 of lemma length, muticous or awned; principal lemma awns (0–)4–13(–25) mm long from a sinus, straight, or geniculate, column twisted, glabrous or hispidulous. Distribution: tropical and temperate Africa and South America.

162. *Sorghum arundinaceum* (Desv.) Stapf

FIGURE 171

Sorghum arundinaceum (Desv.) Stapf, Fl. Trop. Afr. 9: 114. 1917.
Common names: Cameroon grass, common wild sorghum, Tunis grass.

Solitary annuals or short-lived perennials. Culms up to 400 cm tall, erect, robust, geniculate; internodes glabrous; nodes glabrous or pubescent, often lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; ligules 2–3 mm long, ciliate membrane; blades 5–70 cm long, 0.5–6 cm wide, linear, spreading, hairy on the basal ⅓, margins scabrous, white midribs recessed above and protruding below on lower ⅔, base cordate, apex attenuate. Panicles 10–60 cm long, open, linear, lanceolate or ovate; primary branches (rames) not whorled; rames 0.8–2 cm long, bearing 2–7 fertile spikelets. Fertile spikelets 4–9 mm long, lanceolate to ovate, dorsally compressed, acute; lemma awnless or awned, the awns 1–30 mm long. Pediceled spikelets staminate or sterile; lemmas awnless. Distribution: Africa to India and Australia.

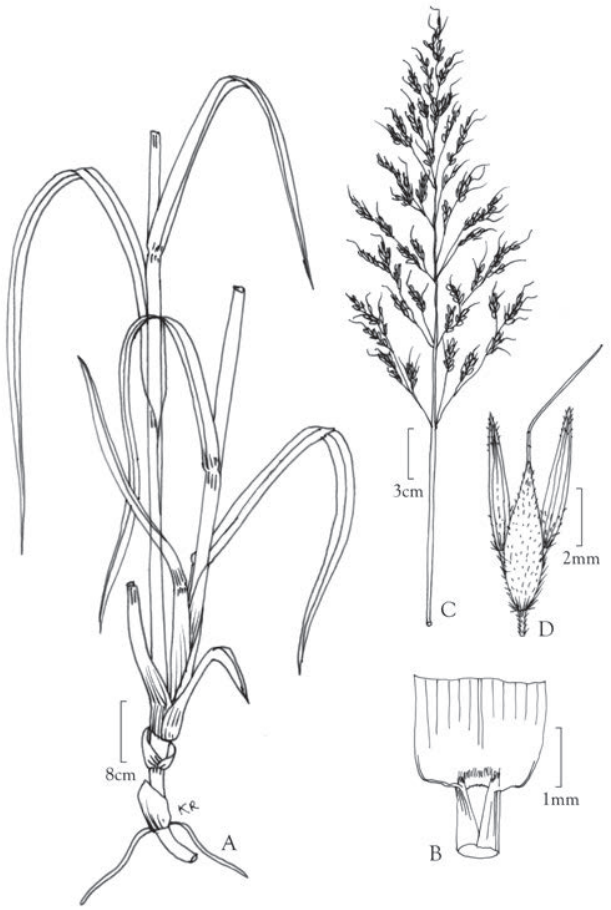


FIGURE 171. *Sorghum arundinaceum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Ndegwa 502* (US-3066978), *M. Myre* (US-2151002).

163. *Sorghum bicolor** (L.) Moench

FIGURE 172

*Sorghum bicolor** (L.) Moench, Methodus 207. 1794.
Common names: *abora, gauri, nion*; broom millet, Sudan grass, sweet sorghum.

Caespitose annuals or short-lived perennials. Culms up to 250 cm tall, erect, robust, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; oral hairs present; ligules 2–3 mm long, ciliate membrane; blades 30–70 cm long, 0.5–7 cm wide,

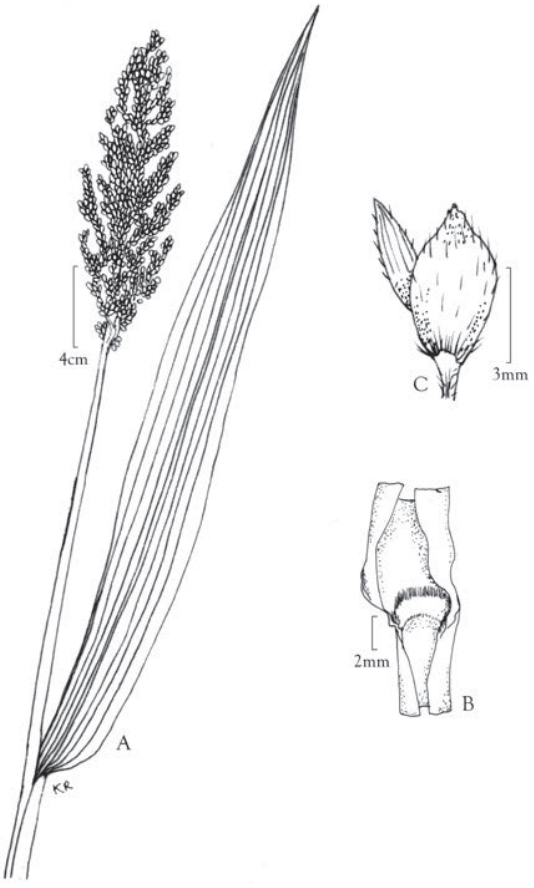


FIGURE 172. *Sorghum bicolor.* A. Leaf blade and inflorescence. B. Ligule, sheath, and blade. C. Spikelet pedicellate (left) and sessile (right). A, B drawn from *L. H. Dewey 161* (US-431586); C modified from Barkworth (2003).

linear-lanceolate; spreading, glabrous, margins scabrous, bases cordate, apex acuminate. Panicles 4–50 cm long, 2–20 cm wide, open or contracted, lanceolate or ovate or globose, equilateral, or nodding, spreading; rames bearing few fertile spikelets. Fertile spikelets 3–10 mm long, in pairs, oblong or ovate or obovate or orbicular, dorsally compressed; pediceled spikelets staminate or sterile; lemmas unawned or awned, awns 3–10(–30) mm long, geniculate, column twisted, pubescent. Habitat: cultivated cereal and weed. Distribution: tropical Old World.

164. *Sporobolus festivus* Hochst. ex A. Rich.

FIGURE 173

Sporobolus festivus Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 398. 1850.

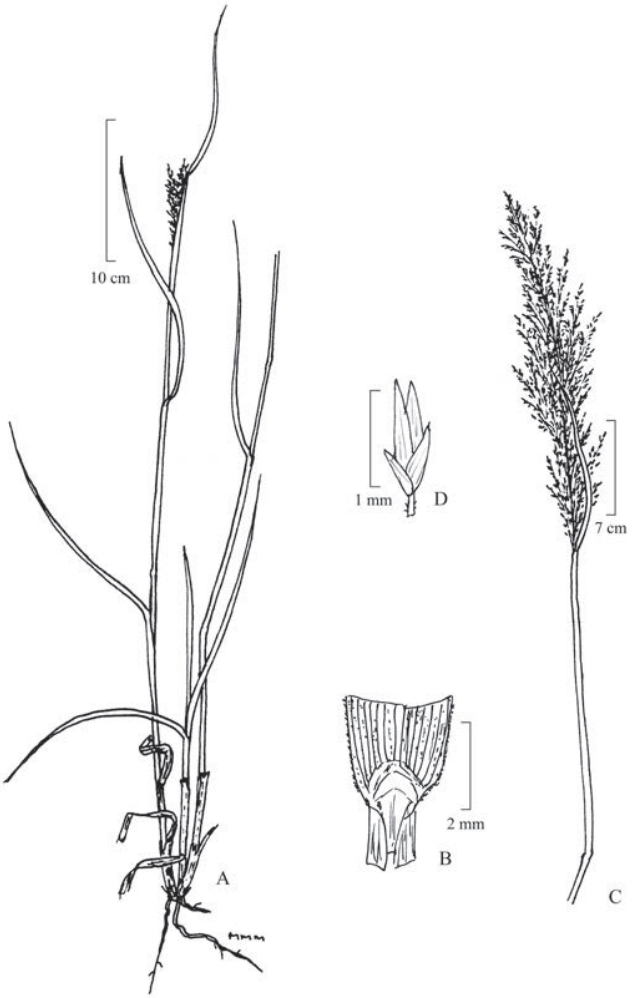


FIGURE 173. *Sporobolus festivus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *A. A. Bullock 2403* (US 2239047).

Common names: *kafini, kononi*; bird's broom, hare's grass, red dropseed.

Densely caespitose perennials. Culms 10–60 cm, 1–2 mm wide high, erect or geniculate-ascending, slender; branching from lower nodes; butt sheaths glabrous, persistent, becoming fibrous with age. Leaves mostly basal; sheaths glabrous, margins glabrous or ciliate, ribbed; collar ciliate, not whitish; ligules a fringe of hairs; blades 2–7 cm long, 1–2 mm wide, convolute, sometimes flat, scabrous, apex attenuate. Panicles 3–22 cm long, narrowly ovate, open, very delicate and diffuse. Spikelets 1–1.5 mm long, 1-flowered, greyish green or purplish; lemmas apex acute; anthers 0.6–0.8 mm long, 3 in number. Distribution: tropical and temperate Africa and Asia.

165. *Sporobolus helvolus* (Trin.) T. Durand & Schinz

FIGURE 174

Sporobolus helvolus (Trin.) T. Durand & Schinz, Consp. Fl. Afr. 5: 820. 1894.
Common names: *afer, shakatee*; khev grass.

Tufted perennials with elongated rhizomes; stolons present or absent. Culms 15–60 cm long, 1 mm in diameter, wiry; branching from lower nodes. Leaves basal and cauline; leaf sheaths glabrous, ribbed; ligules fringe of hairs; leaf blades 2–15 cm long, 2–4 mm wide, linear, flat, glaucous, sparsely hairy adaxially, base subcordate, apex acuminate. Inflorescences 4–12 cm long, 5–20 mm wide, an open panicle, linear to narrowly lanceolate, usually distinctly branched. Spikelets 1.4–2 mm long, 1-flowered, lanceolate, greenish-brown; lemma apex acute; anthers 0.6–0.8 mm long, 3 in number. Distribution: tropical and temperate Africa and Asia.

166. *Sporobolus ioclados* (Nees ex Trin.) Nees

FIGURE 175

Sporobolus ioclados (Nees ex Trin.) Nees, Fl. Afr. Austral. Ill. 161. 1841.
Common names: bushveld dropseed, pan dropseed.

Caespitose perennials; stolons sometimes present. Culms 10–80 cm tall, erect, geniculate; basal innovations subterete or flabellate; internodes glabrous, striped; nodes dark; butt sheaths glabrous. Leaves basal and cauline; flattened, ribbed, glabrous, margins membranous; oral hairs present; ligules fringe of hairs; blades 2–20 cm long, 1–3 mm wide, flat or convolute, straight, ascending, scabrous, margins cartilaginous, bases narrow, apex acuminate. Panicles 3–20 cm long, open to somewhat contracted, pyramidal. Spikelets 1.5–3(–3.3) mm long, 1-flowered, lanceolate, subterete; lemmas 1.5–3 mm long, awnless; anthers

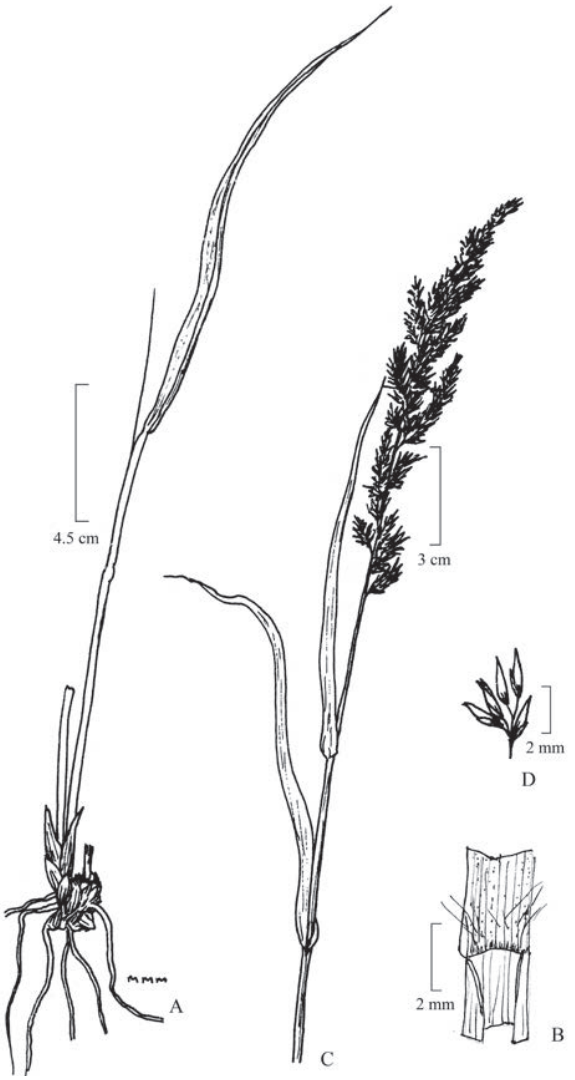


FIGURE 174. *Sporobolus helvolus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *William Burger 2160* (US 2465166).

0.7–1 mm long, 3 in number. Distribution: tropical Africa, Arabia to India.

167. *Sporobolus microprotus* Stapf

FIGURE 176

Sporobolus microprotus Stapf, Bull. Soc. Bot. France 58(8): 218. 1912.

Loosely caespitose annuals. Culms 10–50 cm high, erect, or geniculately ascending; internodes glabrous; nodes dark; branching from lower nodes; butt sheaths glabrous. Leaves basal and

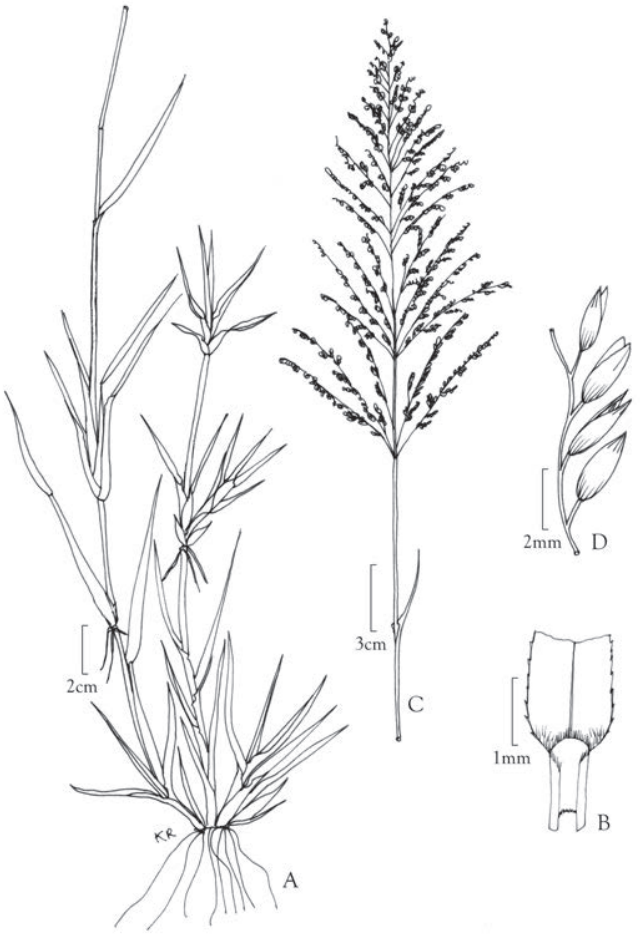


FIGURE 175. *Sporobolus ioclados.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Inflorescence branch with four spikelets. A, C drawn from *Migahid & Sheikh 429-A* (CAI); B, D drawn from *J. Ash* (US-2837164).

cauline; sheaths glabrous, slightly compressed; collars whitish; ligules fringe of hairs; blades 2–14 cm long, 3–7 mm wide, hairy on basal ⅓, margins ciliate toward the base. Panicles 3–12 cm long, open, ovate; primary branches spreading, whorled at most nodes. Spikelets 1–1.2 mm long, 1-flowered, lanceolate, subterete; lemma apex acute, awnless; anthers 0.3–0.6 mm long, 2. Distribution: tropical Africa.

168. *Sporobolus pectinellus* Mez

FIGURE 177

Sporobolus pectinellus Mez, Repert. Spec. Nov. Regni Veg. 17: 295. 1921.

Delicate, caespitose annuals. Culms 10–45 cm high, slender, erect or geniculate; branches arising from lower nodes; butt sheaths

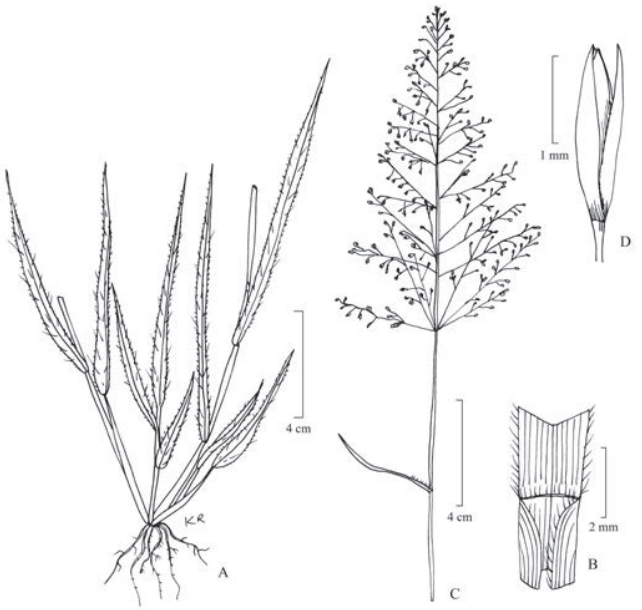


FIGURE 176. *Sporobolus microprotus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. Laegaard & Sobere Traore 17834* (US-3591416).

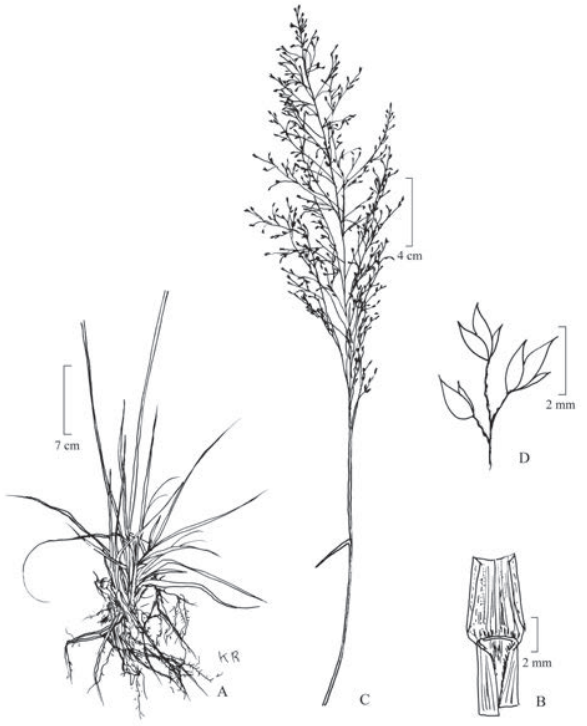


FIGURE 177. *Sporobolus pectinellus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D Bogdan Collection, NARS, Kitale, Kenya; B drawn from Poilecot (1995).

glabrous. Leaves mostly basal; sheaths glabrous; ligules fringe of minute hairs; collars whitish; blades 1–8 cm long, 1–3 mm wide, flat or convolute, rather stiff, margins scabrid, apex attenuate. Panicles 3–18 cm long, open, ovate-oblong; branches delicate and diffuse; pedicels capillary. Spikelets 0.8–1.2(–2) mm long, 1-flowered, lanceolate; lemma apex acute; anthers 0.5–0.6 mm long, 3 in number. Distribution: tropical Africa.

169. *Sporobolus pyramidalis* P. Beauv.

FIGURE 178

Sporobolus pyramidalis P. Beauv., Fl. Oware 2: 36. 1816.
Common names: *burdi, gansegui*; cat's tail dropseed, giant rats grass, whorled dropseed.

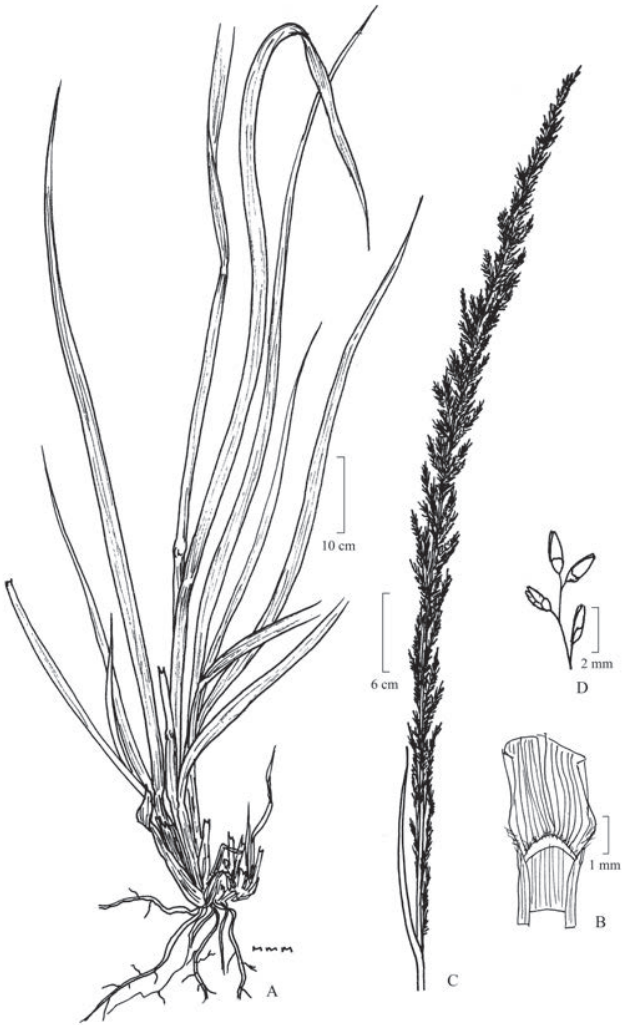


FIGURE 178. *Sporobolus pyramidalis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from *J. P. M. Brenan* & *P. J. Greenway 7880* (US-2464594).

Caespitose perennials. Culms 90–200 cm tall, 2–5 mm in diameter at the base; branches arising from the lower nodes or lacking; internodes and nodes pubescent; butt sheaths glabrous or pubescent, scarious. Leaves mostly basal; sheaths keeled, glabrous, lower ones compressed tending to become bulbous at the base; ligules fringe of hairs; blades 20–50 cm long, 0.3–1 cm wide, linear or filiform, flat or convolute when dry, scabrid or glabrous with distinct white midrib for ⅓ their length; margins cartilaginous; apex tapering to a flexuous filiform tip. Panicles 20–45 cm long, open, pyramidal; primary branches ascending, tightly contracted. Spikelets (1.4)1.7–2(2.3) mm long, 1-flowered, lanceolate, green to greyish or purplish; lemma apex acute; anthers 0.6–1.1 mm long, 3 in number. Distribution: tropical and temperate Africa, Asia, Australis, and South America.

170. *Sporobolus spicatus* (Vahl) Kunth

FIGURE 179

Sporobolus spicatus (Vahl) Kunth, Révis. Gramin. 1:67. 1829. Common names: *beurgu*; rat's tail, salt grass.

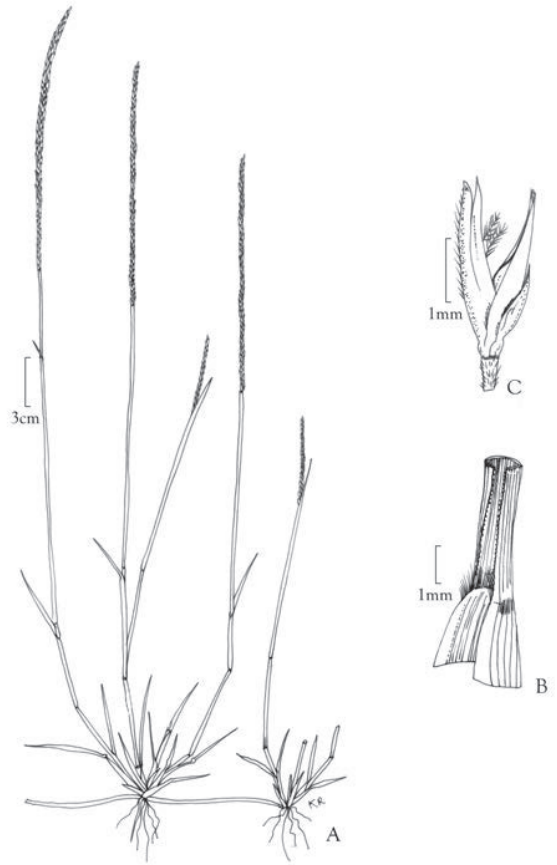


FIGURE 179. *Sporobolus spicatus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *L. Boulos s.n.* (CAI); B drawn from *P. Greenway 8766* (US-2464345).

Mat-forming perennials; stolons present. Culms 10–70 cm tall, erect, wiry, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, glabrous, margins membranous; oral hairs present; ligules fringe of hairs; blades 2–25 cm long, 1–3 mm wide, flat or convolute, straight, ascending, hairy on basal ⅓, margins pubescent, apex spiny pungent. Panicles 1.5–20 cm long, 0.2–0.4 cm wide, spiciform, linear. Spikelets 1.4–2.2(–2.8) mm long, 1-flowered, lanceolate, subterete, appressed; lemmas 0.8–2.2 mm long, awnless; anthers 1–1.2 mm long, 3 in number. Distribution: Africa to India.

171. *Sporobolus stolzii* Mez

FIGURE 180

Sporobolus stolzii Mez, Repert. Spec. Nov. Regni Veg. 17(19–30): 297. 1921.

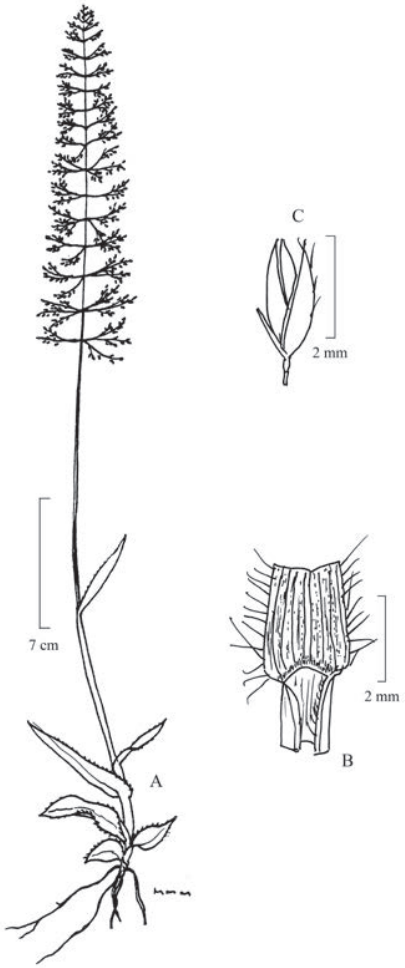


FIGURE 180. *Sporobolus stolzii.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from *H. M. Richards 21377* (US-2537361).

Caespitose annuals. Culms 10–60 cm long, erect; internodes glabrous. Leaves mostly basal; sheaths hairy; margins hairy, ligules fringe of hairs; blades 1–6 cm long, 2–6 mm wide, lanceolate, pectinate-ciliate on the margins. Panicles 5–14 cm long, narrowly elliptic; branches in whorls and hispidulous bearing 6–30 spikelets. Spikelets 0.9–1.6 mm long, 1-flowered, glabrous or hispidulous; lemmas awnless; anthers 0.1–0.4 mm long, 3 in number. Distribution: Africa.

172. *Stapfochloa lamproparia* (Stapf) H. Scholz

FIGURE 181

Stapfochloa lamproparia (Stapf) H. Scholz, Willdenowia 34: 131. 2004. [*Chloris lamproparia* Stapf]

Caespitose annuals. Culms 30–60 cm high, erect, ascending or decumbent, with or without rooting at the lower nodes; a few branches from the lower nodes; internodes glabrous; nodes dark, lower nodes rooting or not. Leaves basal and cauline; sheaths keeled, open, glabrous, ribbed with membranous margins; ligules ciliolate membrane; blades 4–16(–20) cm long, 3–5 mm wide, flat or folded, apex acuminate. Inflorescences of 2–4, paired or closely digitate, silky, golden racemes, the racemes 4–11 cm long, embraced by an inflated leaf sheath. Spikelets 2–2.5 mm long, 4-flowered, 2-awned; fertile lemmas 3–4 mm long, coriaceous, ciliate on the keel, the cilia 1.5–4 mm long; principal lemma awns subapical, straight, the awns 2.5–4 mm long. Distribution: tropical Africa.



FIGURE 181. *Stapfochloa lamproparia.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from Poilecot (1995).

173. *Stipagrostis acutiflora* (Trin. & Rupr.) De Winter

FIGURE 182

Stipagrostis acutiflora (Trin. & Rupr.) De Winter, Kirkia 3: 133. 1963.

Caespitose perennials; stolons sometimes present. Culms 20–60 cm tall, erect, weak; internodes densely pubescent; nodes dark; butts sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, margins membranous; oral hairs present; ligules 1 mm long, fringe of hairs; blades 4–6 cm long, 1–2 mm wide, filiform, convolute, straight or curved, stiff, scabrous,

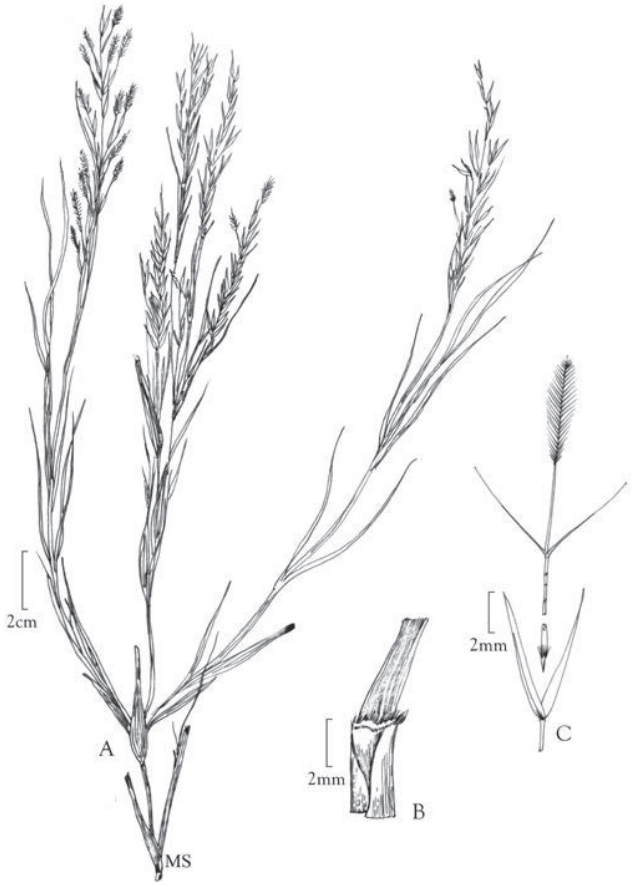


FIGURE 182. *Stipagrostis acutiflora.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A, C drawn from *E. Canon s.n.* (US-152805), *A. Amin s.n.* (CAI); B drawn from *L. Chevallier s.n.* (US-550638).

margins scabrous, apex acuminate. Panicles 5–15 cm long, open, lanceolate, sometimes included in the sheath below. Spikelets 9 mm long, lanceolate, subterete; lemmas 5 mm long, 3-awned, central awns 10–15 mm long, feathery, column slightly twisted. Distribution: northern Africa and Arabia.

174. *Stipagrostis hirtigluma* (Steud. ex Trin. & Rupr.) De Winter

FIGURE 183

Sipagrostis hirtigluma (Steud. ex Trin. & Rupr.) De Winter, Kirkia 3: 134. 1963.

Caespitose annuals or short-lived perennials. Culms 30–70 cm tall, erect, geniculate; internodes glabrous, ribbed; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins membranous; ligules fringe of hairs; blades 6–20 cm long, 1–2 mm wide, filiform, convolute, straight, stiff, scabrous, margins scabrous, apex acuminate. Panicles 10–15 cm long, open. Spikelets 10–13 mm long, lanceolate, subterete; lemmas 3.5–4 mm long, 3-awned, central awns 35–55 mm long, feathery, column twisted. Distribution: tropical and temperate Africa to Arabia and India.

175. *Stipagrostis uniplumis* (Licht.) De Winter

FIGURE 184

Stipagrostis uniplumis (Licht.) De Winter, Kirkia 3: 136. 1963.

Caespitose perennials. Culms 30–80 cm tall, erect; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins membranous; ligules

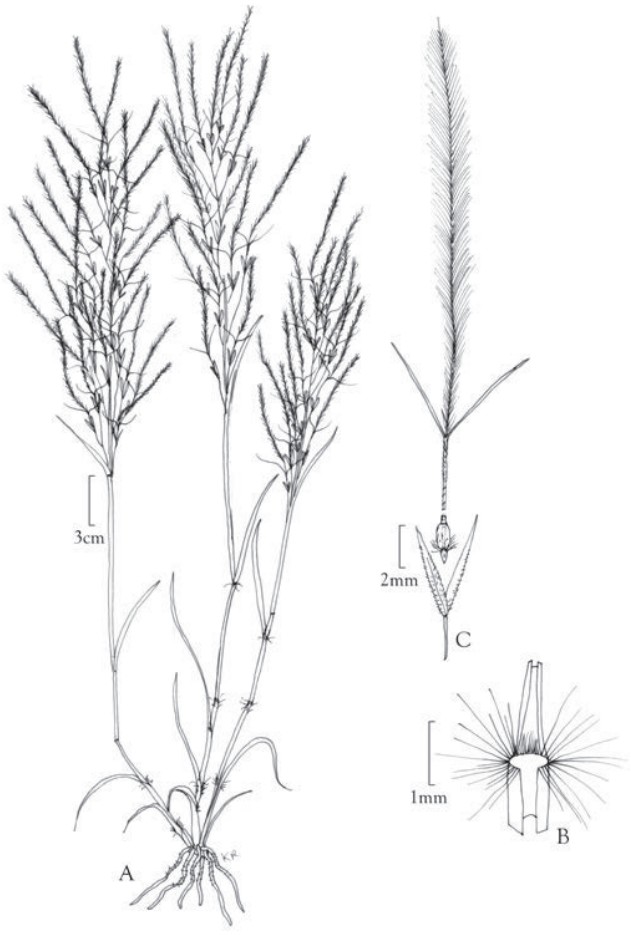


FIGURE 183. *Stipagrostis hirtigluma.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Zahran 369* (CAI); B, C drawn from *J. P. Mandaville 3369* (US-2653898).

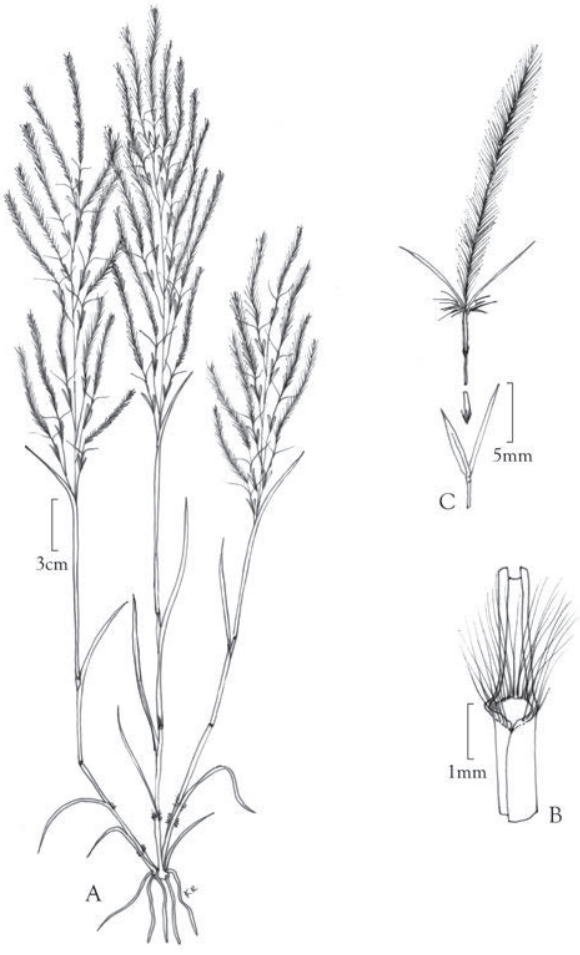


FIGURE 184. *Stipagrostis uniplumis.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *V Täckholm, M. Kassas, H. Fawzi, M. Zahran 2061*; B, C drawn from *De Winter & Hardy 8063* (US-3510523).

fringe of hairs; blades 5–15 cm long, 0.5–1.5 mm wide, filiform, convolute, curly, scabrous, margins smooth, apex attenuate. Panicles 10–15 cm long, open, terminal, partially included in the sheath. Spikelets 9–10 mm long, lanceolate, subterete; lemmas 2–3.5 mm long, central awns 20–35 mm long, feathery, column twisted. Distribution: temperate and tropical Africa and Asia.

176. *Tetrapogon cenchriformis* (A. Rich.) Clayton

FIGURE 185

Tetrapogon cenchriformis (A. Rich.) Clayton, Kew Bull. 16: 250. 1962.
Common name: *tadjemait*.

Caespitose annuals or short-lived perennials. Culms 30–60 cm tall, erect, geniculate, glabrous; nodes dark nodes; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, keeled or flattened basally, margins scabrous; oral hairs present; collars dark colored; ligules ciliolate membrane; blades 3–12 cm long, 2–4 mm wide, filiform, convolute, spreading, hairy on the basal ⅓, margins smooth, apex obtuse. Racemes 3–6 cm long, single or paired, ascending, unilateral, subtended by an inflated leaf sheath. Spikelets 7–12 mm long, cuneate, laterally compressed, surrounded by hairs; lemmas 4–6 mm long, awned, the awns 2–8 mm long, straight. Distribution: Macronesia, Africa, and Arabia.

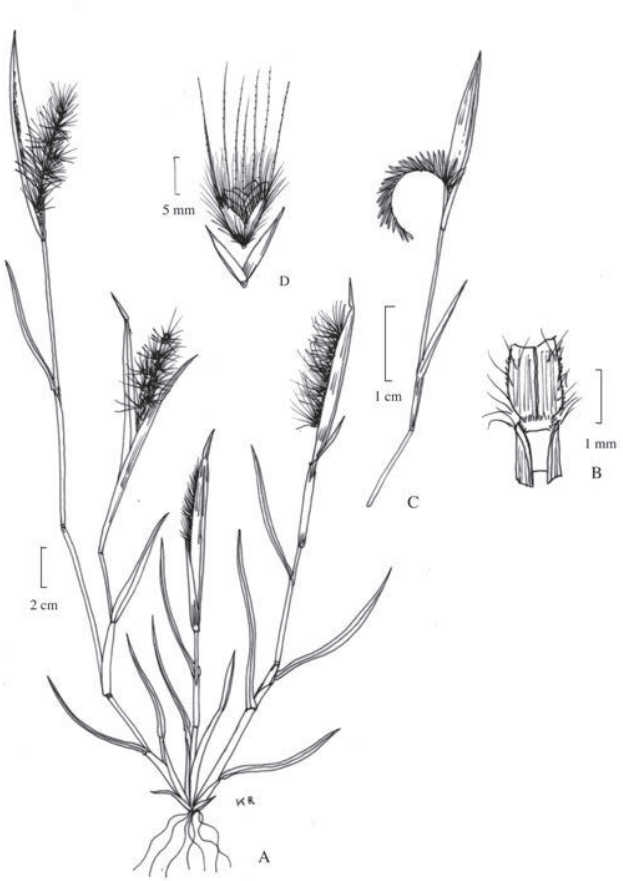


FIGURE 185. *Tetrapogon cenchriformis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *B. Fruman 3459* (CAI); B–D drawn from *G. Schweinfurth 582* (US-1259634).

177. *Themeda triandra* Forssk.

FIGURE 186

Themeda triandra Forssk., Fl. Aegypt.-Arab. 178. 1775.
Common names: angle grass, blue grass, kangaroo grass, red grass.

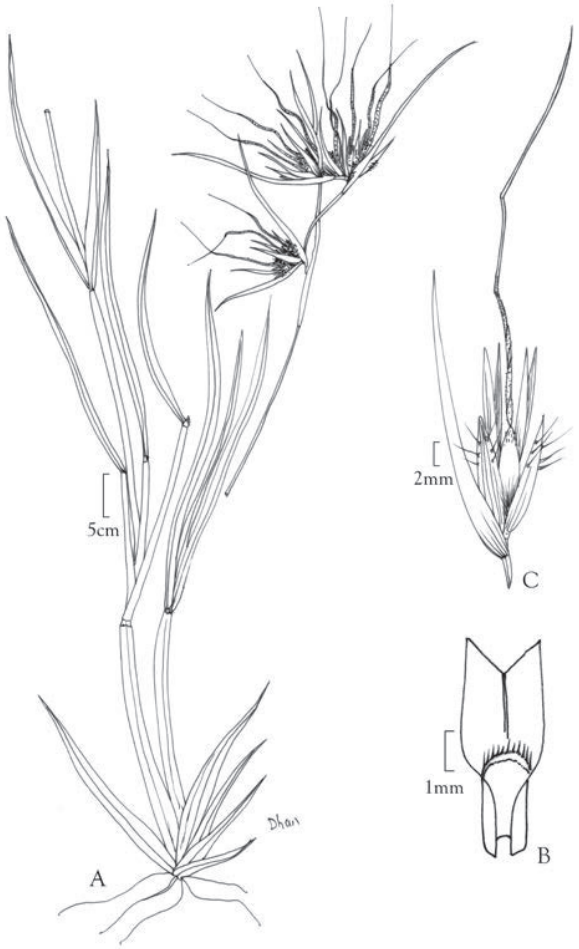


FIGURE 186. *Themeda triandra*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet cluster. A drawn from *Ibrahim 2405* (CAI), *M. Kassas 547* (CAI); B, C drawn from *Christie s.n.* (US-2014264).

Caespitose perennials. Culms 60–200 cm tall, erect, geniculate, glabrous; nodes bearded; butt sheaths glabrous, withering. Leaves basal and cauline; sheaths flattened, glabrous, margins scabrous; ligules 1–2 mm long, ciliolate membrane; blades 10–30 cm long, 1–4 mm wide linear, ascending, glabrous, reddish, inconspicuous midrib drying white, margins smooth, apex acute. Inflorescences 10–30 cm long, composed of terminal and axillary racemes, subtended by a spatheole; spatheoles 1.5–3.5 cm long, lanceolate, scarious, brown or red, sometimes tuberculate. Spikelets borne in threes; sessile spikelets 6–11 mm long, elliptic, subterete, surrounded by hairs; fertile florets 6–11 mm long, sessile, awned; the awns 25–70 mm long, terminal, geniculate, bristly. Distribution: tropical and subtropical Old World.

178. *Tragus berteronianus* Schult.

FIGURE 187

Tragus berteronianus Schult., Mant. 2: 205.1824.
Common names: burgrass, carrot-seed grass, pricklegrass.

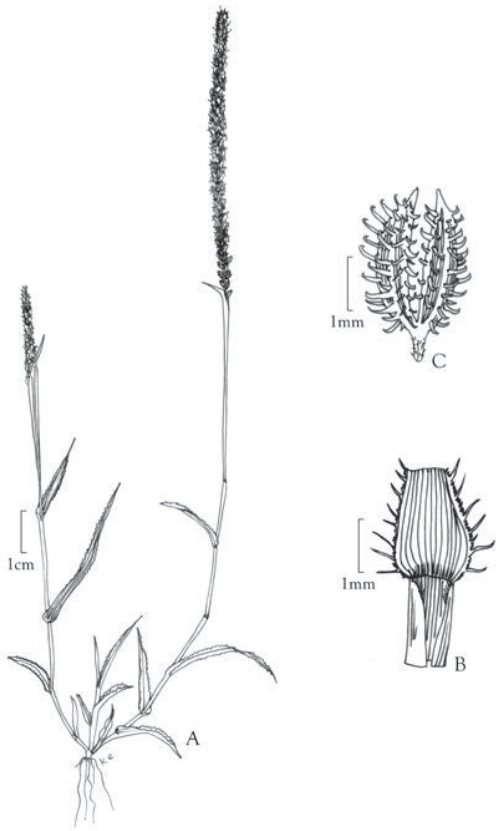


FIGURE 187. *Tragus berteronianus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, M. Zahran, M. Samy, A. Girgis 560* (CAI); B drawn from *A. S. Hitchcock 24840* (US-1447214); C modified from Hitchcock (1951).

Caespitose annuals. Culms 5–20 cm tall, erect, geniculate, glabrous; butt sheaths glabrous, withering. Leaves basal and cauline, sheaths longer than blades, glabrous, margins sparsely hairy; oral hairs present; ligules fringe of hairs; blades 1–5 cm long, 1–5 mm wide, lanceolate, flat, scabrous, margins ciliate, bases cordate, apex acute. Inflorescences 2–7.5 cm long, composed of numerous racemes borne along a central axis, closely spaced in a multilateral false spike, spreading, oblong; racemes 3–7 mm long. Spikelets 2–3 mm long, lanceolate, subterete; lemmas 1.5–2.5 mm long, awnless. Distribution: Africa, southwestern Asia, China, and the Western Hemisphere.

179. *Tragus racemosus* (L.) All.

FIGURE 188

Tragus racemosus (L.) All., Fl. Pedem. 2: 241. 1785.
Common names: stalked bristle grass, stalked burgrass, sweetheart grass.



FIGURE 188. *Tragus racemosus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. J. Rodin 3620* (US-1983592), *A. Pappi s.n.* (US-1984347); C modified from Wipff (2003b).

Caespitose annuals. Culms 5–20 cm tall, erect, geniculate, glabrous; butt sheaths glabrous, withering. Leaves basal and cauline; sheath longer than blade, glabrous, margins membranous; oral hairs present; ligules fringe of hairs; blades 3–5 cm long, 2–5 mm wide, lanceolate, flat, scabrous, margins ciliate, apex acute. Inflorescences 2–7.5 cm long, composed of numerous racemes borne along a central axis, closely spaced in a multilateral false spike, spreading; racemes 0.4–0.9 cm long, cuneate bearing 2–4 fertile spikelets. Spikelets 4–5.5 mm long, lanceolate, dorsally compressed; lemmas 3.5–5 mm long, awnless. Distribution: Europe, temperate Asia, and tropical northern Africa.

180. *Trichanthecium brazzavillense* (Franch.) Zuloaga & Morrone

FIGURE 189

Trichanthecium brazzavillense (Franch.) Zuloaga & Morrone, Syst. Bot. Monogr. 94: 21. 2011. [*Panicum brazzavillense* Franch.]

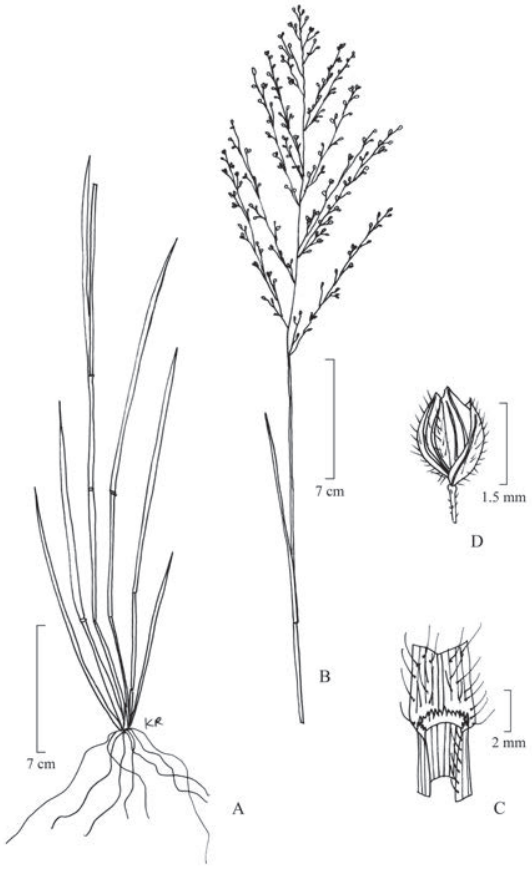


FIGURE 189. *Trichanthecium brazzavillense*. A. Habit. B. Inflorescence. C. Ligule, sheath, and blade. D. Spikelet. A–D drawn from *E. Milne-Redhead 4016* (US- 2640071) & *R. Wingfield 4148* (US-2967808).

Caespitose perennials. Culms (20–)60–80(–85) cm long, erect, or geniculately ascending, slender; a few branches from the lower nodes; internodes glabrous; butt sheaths persistent and investing base of culms with compacted dead sheaths or fibrous dead sheaths. Leaves mostly basal; sheaths glabrous; ligules ciliate membrane; leaf blades 10–20(–25) cm long, 1–3 mm wide, ascending, conduplicate or involute, stiff, glabrous, or pilose, straight at the bases, apex acuminate. Panicles 3–15(–20) cm long, open, oblong or ovate. Spikelets 1.2–1.7 mm long, solitary, ovate or orbicular, dorsally compressed; lemma apex obtuse, awnless. Distribution: tropical and temperate Africa.

181. *Trichanthecium parvifolium* (Lam.) Zuloaga and Morrone

FIGURE 190

Trichanthecium parvifolium (Lam.) Zuloaga and Morrone, Syst. Bot. Monogr. 94: 59. 2011. [*Panicum parvifolium* Lam.]
Common name: small-flowered panic grass.

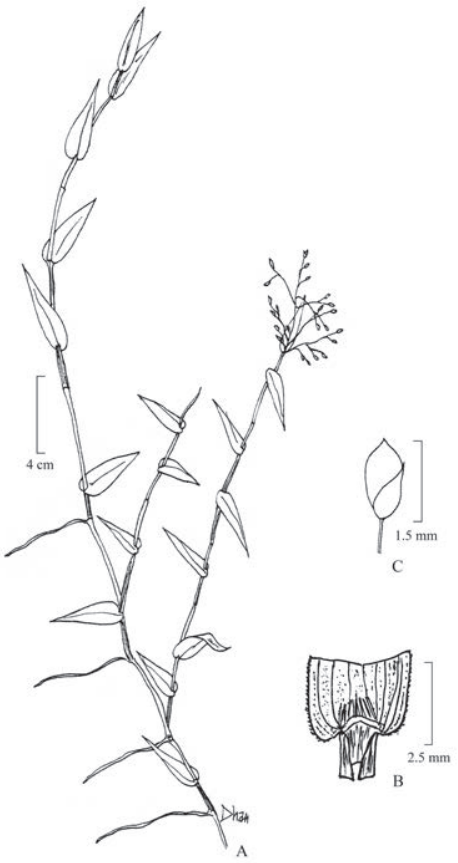


FIGURE 190. *Trichanthecium parvifolium*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from Ibrahim and Kabuye (1988); B drawn from *H. Humbert 5753* (US-150688.)

Delicate prennials. Culms 8–50 cm long, prostrate, slender, wiry; branching below; internodes glabrous; lower nodes rooting. Leaves basal and cauline; sheaths glabrous; ligule a ciliate membrane; blades 1.5–3 cm long, 2–7 mm wide, ascending, or reflexed (at maturity), lanceolate to ovate, glaucous, venations with distinct cross veins, glabrous or pilose, bases cordate, apex acute. Panicles 1–3 cm long, open, exserted, or embraced at base by subtending leaf sheath, ovate; primary branches spreading or reflexed. Spikelets 1–2 mm long, solitary, oblong or ovate, dorsally compressed; lemma apex obtuse, awnless. Distribution: Tropical Africa, southern and western Indian Ocean, and Western Hemisphere.

182. *Trichoneura mollis* (Kunth) Ekman

FIGURE 191

Trichoneura mollis (Kunth) Ekman, Ark. Bot. 11(9): 10. 1912.

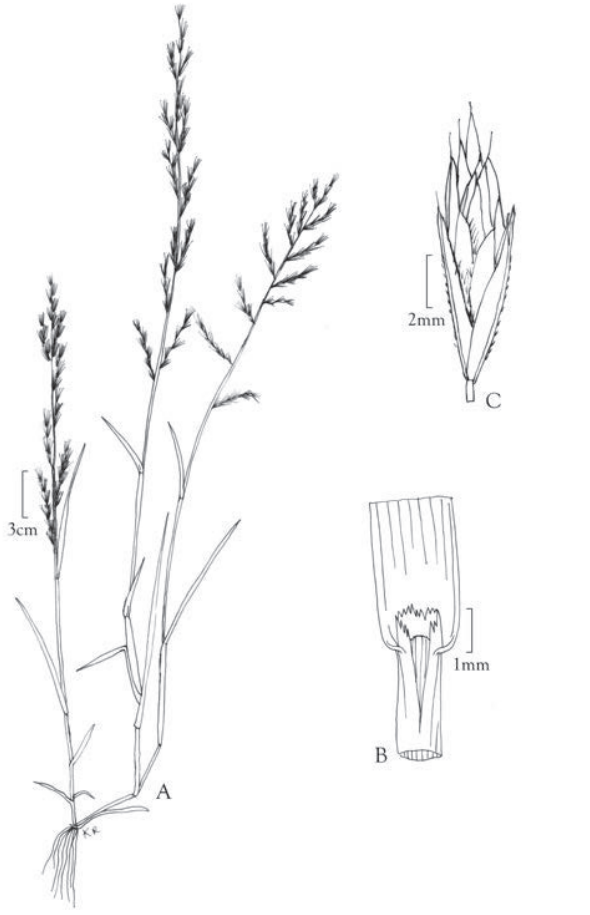


FIGURE 191. *Trichoneura mollis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Samy, M. Zahran 1526* (CAI); B, C drawn from *W. Schimper* (US-1126174), *Napper 550* (US-2379660).

Caespitose annuals. Culms 5–20 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths sparsely hairy, margins membranous; ligules 1–2 mm long, membranous, apex erose, serrate; blades 2–15 cm long, 1–5 mm wide, linear, flat or involute, spreading, glabrous to pilose, margins scabrous, apex acute. Inflorescences 5–25 cm long with 10–40 racemes located along a central axis; racemes 1.5–4(–5) cm long. Spikelets 6.2–8 mm long, cuneate, laterally compressed; lower glumes 4.6–7 mm long, 1-awned, the awns 1–2 mm long; lemmas 2.5–3.5 mm long, mucronate or awned, the awns up to 2 mm long. Distribution: tropical Africa and Arabia.

183. *Tripogonella minima* (A. Rich.) P. M. Peterson & Romasch.

FIGURE 192

Tripogonella minima (A. Rich.) P. M. Peterson and Romasch., Taxon 65(6): 1278. 2016. [*Tripogon minimus* (A. Rich.) Hochst. ex Steud.]

Caespitose perennials. Culms 5–28 cm long, erect, very slender wiry; butt sheaths persistent and investing base of culm with fibrous dead sheaths; roots forming a fine dense mat. Leaves mostly

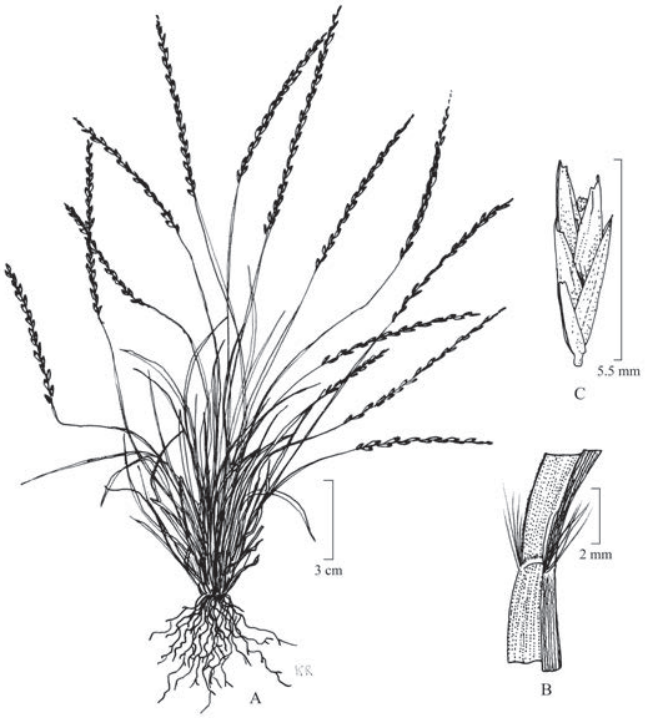


FIGURE 192. *Tripogonella minima*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *S. Laegaard 15919* (US-3292337).

basal; sheaths glabrous, often purple-tinged; ligules ciliolate membrane; blades 1–9 cm long, about 0.5 mm wide, filiform, pilose above and on margins, involute or conduplicate, curved or straight, apex acute. Single raceme 2–8 cm long, erect, straight, unilateral. Spikelets 2.6–8 mm long, solitary, elliptic, laterally compressed; lemma apex emarginate, mucronate or awned; principal lemma mucro/awns 0.1–0.7(–1.2) mm long from a sinus. Distribution: tropical and temperate Africa to western Indian Ocean.

184. *Tristachya superba* (De Not.) Schweinf. & Asch.

FIGURE 193

Tristachya superba (De Not.) Schweinf. and Asch., Beitr. Fl. Aethiop. 302. 1867.
Common names: giant trident grass, hairy trident grass.

Caespitose perennials with short rhizomes. Culms 120–240 cm long, erect, stout; a few branches arising from lower nodes; internodes glabrous or loosely pilose; nodes dark; butt sheaths thickened and forming bulbs, pubescent or woolly. Leaves mostly basal; sheaths tough, coarsely to finely striate, the lower overlapping, tomentose, upper glabrous rarely pubescent to villous; collar dark; ligules dense fringe of hairs; blades 30–60 cm long, 0.5–1.2 cm wide, linear-lanceolate, glaucous, flat, glabrous with prominent midribs below, slightly scabrid margins, sometimes involute. Panicles 20–40 cm long, contracted, linear, branches glabrous or villous. Spikelets 25–35 mm long, in threes, or in pairs (rarely), lanceolate, laterally compressed; lemma apex bilobed with lanceolate lobes; incised 0.2–0.3 of lemma length, acute, awned; principal lemma awns 40–120 mm long from a sinus, geniculate, subterete below, column twisted, deciduous, abscissing from tip of lemma. Distribution: tropical and temperate Africa.



FIGURE 193. *Tristachya superba*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *B. D. Burtt 4606* (US-1539045).

185. *Triticum aestivum* L.*

FIGURE 194

Triticum aestivum L.*, Sp. Pl. 1: 85. 1753.
Common names: *gemah*, *halkama*; bread wheat, silver tip wheat, volunteer wheat.

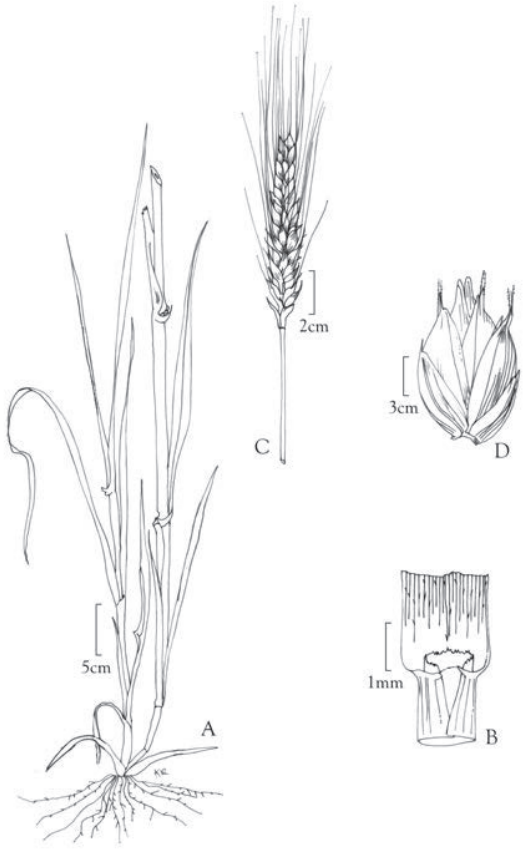


FIGURE 194. *Triticum aestivum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C modified from Hitchcock (1951); D drawn from *L. B. Smith s.n.* (US-1963579).

Caespitose annuals. Culms 60–100 cm tall, erect, geniculate; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; auricles clawlike; collars dark; ligules 1–3 mm long, membranous, apex truncate; blades 10–60 cm long, 10–15 mm wide, linear; flat; spreading, sparsely hairy, margins scabrous, apex acute. Inflorescence a single bilateral spike, 5–18 cm long, linear or oblong. Spikelets 10–15 mm long, 9–18 mm wide, ovate, laterally compressed; glumes 6–12 mm long; lemmas 10–15 mm long, unawned or awned, the awns up to 15 cm long, straight, bristly. Distribution: worldwide.

186. *Urelytrum muricatum* C. E. Hubb.

FIGURE 195

Urelytrum muricutum C. E. Hubb., Kew Bull. 4: 367. 1949.

Caespitose perennials. Culms 120–270 cm long; 3–5 mm in diameter below, erect; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous; oral hairs bearded; ligules ciliolate membrane; blades 45–90 cm long, 3–7 mm wide, linear, flat or convolute, glabrous with conspicuous broad white midrib, nerves prominent, margins scabrid, apex attenuate. Inflorescence with 2–4 paired or digitate racemes; racemes 15–26 cm long, straight, smooth terete. Spikelets 7–10 mm long, oblong, dorsally compressed; lemma apex obtuse, awnless. Distribution: tropical West Africa.

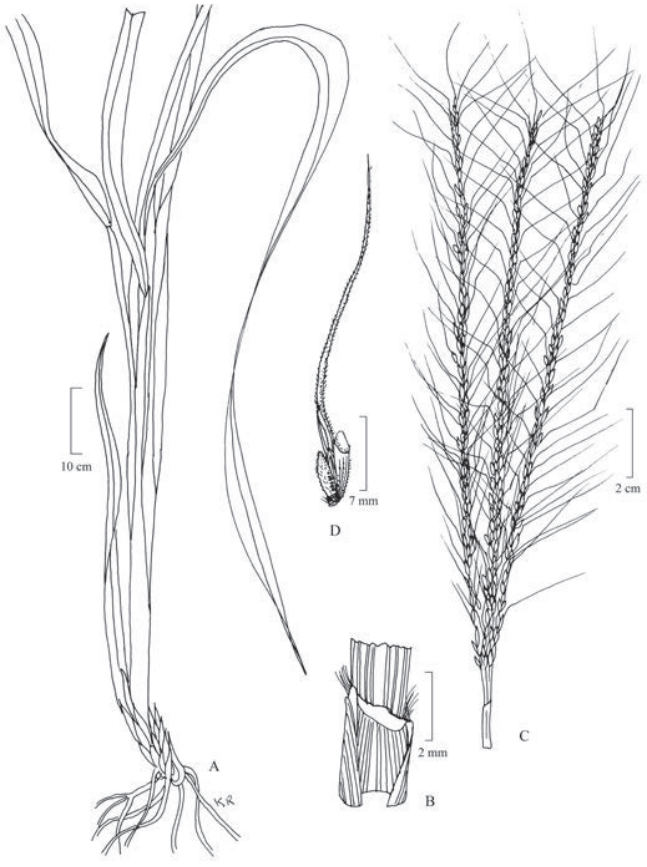


FIGURE 195. *Urelytrum muricutum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *J. O. Ankerah GH 20293* (US-2382060).

187. *Urochloa arrecta* (Hack. ex T. Durand & Schinz) Morrone and Zuloaga

FIGURE 196

Urochloa arrecta (Hack. ex T. Durand and Schinz) Morrone & Zuloaga, Darwiniana 31(1–4): 69. 1992. [*Brachiaria arrecta* (Hack. Ex T. Durand & Schinz) Stent]

Common names: *kussein*; Joe Tanner's grass, Tanner grass.

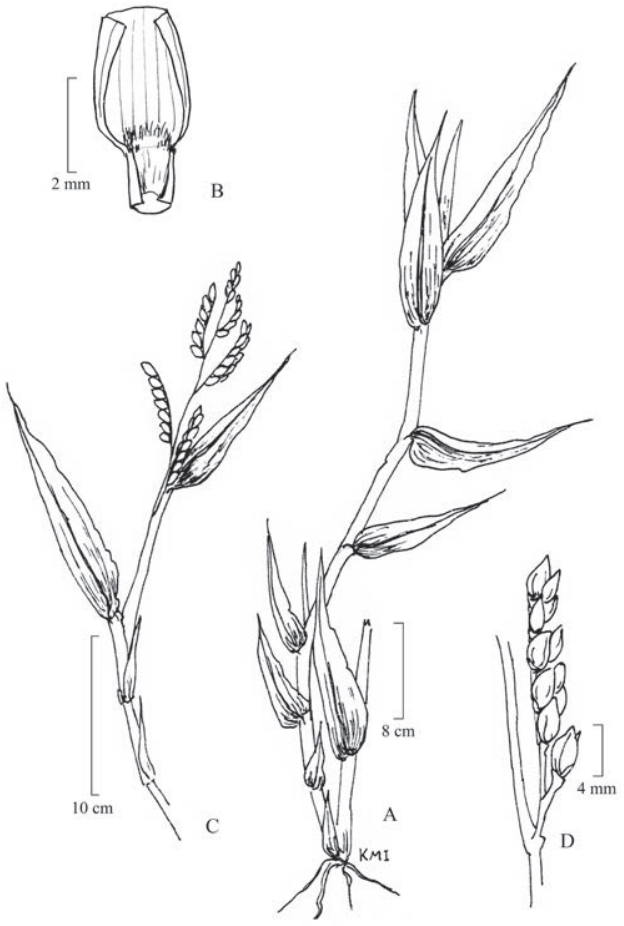


FIGURE 196. *Urochloa arrecta.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *T. Durowt & Shurz s.n.* (US-3412639).

Perennials. Culms 30–130 cm long, prostrate; internodes smooth, angled, rooting at the lower nodes. Leaves basal and cauline; sheaths pubescent with hairy or glabrous margins; ligules fringe of hairs; blades, 5–25 cm long, 0.5–1.5 mm wide, lanceolate, flat base, bases cordate, apex acuminate. Inflorescences of 4–15 racemes borne along central axis; racemes 1–10 cm long. Spikelets 3– 4 mm long, solitary, elliptic; lemma apex obtuse, muticous or mucronate, awnless. Distribution: tropical and South Africa, Indian Ocean; introduced to tropical America.

188. *Urochloa deflexa* (Schumach.) H. Scholz

FIGURE 197

Urochloa deflexa (Schumach.) H. Scholz, Bull. Mus. Natl. Hist. Nat., B, Adansonia, sér. 4, 11(4): 443. 1989 [1990]. [*Brachiaria deflexa* (Schumach.) C. E. Hubb. ex Robyns]

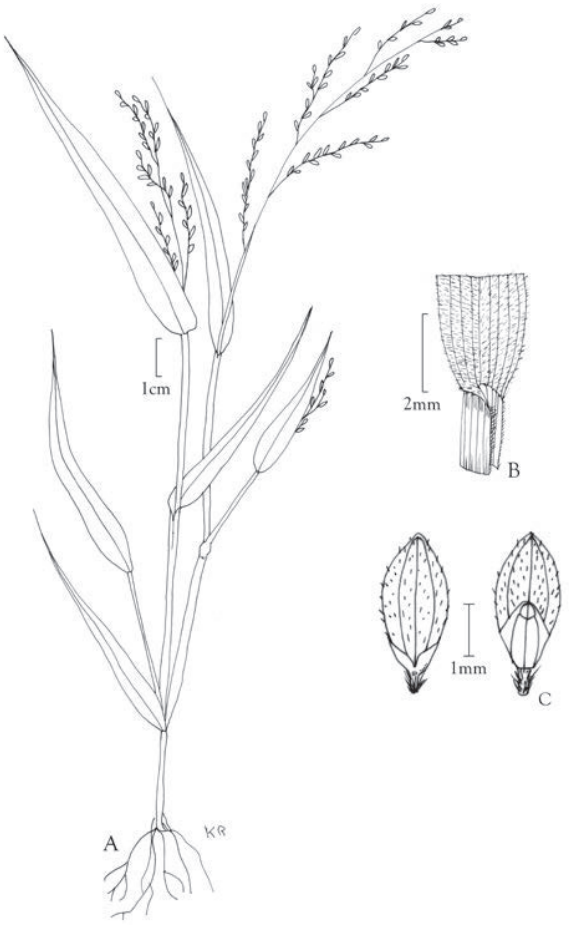


FIGURE 197. *Urochloa deflexa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower glume (left) and upper glume (right). A modified from Ibrahim and Kabuye (1988); B, C drawn from *R. Tanner 2021* (US-2473041), *A. Stolz 1818* (US-1163363).

Common names: *paguiri, yagué yagué ba*; false signal grass, Guinea millet.

Loosely caespitose annuals. Culms 15–70 cm high, weak, geniculately ascending. Leaves mostly cauline; sheaths pubescent with hairy margins; ligules fringe of hairs; blades 4–30 cm long, 0.3–2 cm wide, linear-lanceolate or broadly linear, sparsely hairy with fine midribs recessed above and protruding below, margins scabrid, base cordate, apex acute-acuminate. Inflorescence of 7–15 racemes; racemes 2–10 cm long. Spikelets 2.5–3.5 mm long, in pairs, broadly elliptic; lemma apex acute or mucronate. Distribution: throughout the tropics.

189. *Urochloa jubata* (Fig. & De Not.) Sosef

FIGURE 198

Urochloa jubata (Fig. and De Not.) Sosef, Fl. Trop. Afr. 9: 563. 1919. [*Brachiaria jubata* (Fig. & De Not.) Stapf]
Common names: *ban ngassan, handu nkasan*.

Caespitose perennials. Culms 25–120 cm high; branched from lower nodes; internodes glabrous, striate, lower nodes rooting. Leaves basal and cauline; sheaths glabrous to short

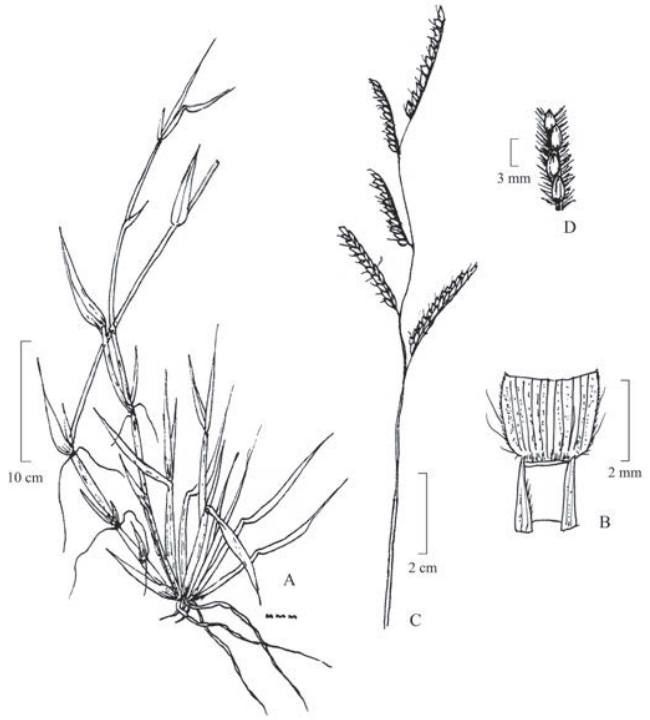


FIGURE 198. *Urochloa jubata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

hairy, often with purple bases below; ligules a fringe of hairs; blades 5–30 cm long, 0. 3–1.5 cm wide, midrib inconspicuous, hyaline above and protruding below, hairy, margins slightly scabrid, bases rounded, often fringed with hairs, apex acute. Inflorescence composed of (3–)5–10(–15) racemes borne along central axis; racemes 1–6 cm long. Spikelets 2.5–3.8 mm, solitary, elliptic; lemma apex acute. Distribution: tropical Africa to western Indian Ocean.

190. *Urochloa lata* (Schumach.) C. E. Hubb.

FIGURE 199

Urochloa lata (Schumach.) C. E. Hubb., Bull. Misc. Inform. Kew 1934: 112. 1934.
[*Brachiaria lata* (Schumach.) C. E. Hubb.]
Common names: *akaru, akasof, ichiban*.

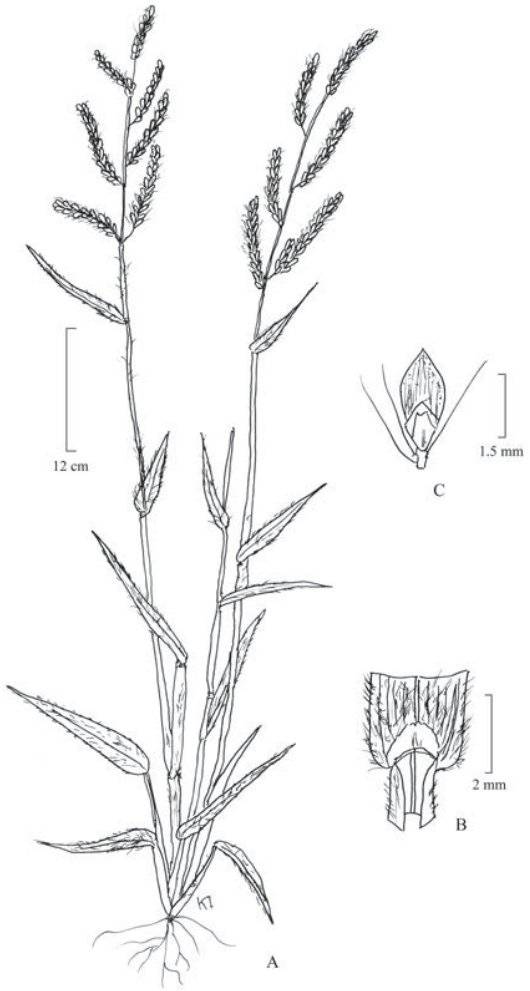


FIGURE 199. *Urochloa lata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *S. Laegaard & Sobere Traore s.n.* (US-3595073).

Caespitose annuals. Culms 30–150 cm long, erect, or geniculately ascending, robust, with or without rooting from lower nodes; branching from the mid culms; internodes glabrous, striate; nodes dark, pubescent. Leaves basal and cauline; sheaths folded, glabrous or hairy, ribbed, margin hairy; collars hirsute; ligules a fringe of hairs; blades 6–12 cm long, 0.8–2.5 cm wide, linear-lanceolate, scabrous or hirsute, with an inconspicuous midrib recessed above and protruding below, tuberculate-ciliate, sometimes undulated, bases broadly rounded or cordate, margins cartilaginous, apex acute. Inflorescence composed of 5–30 racemes borne along a central axis, closely spaced. Spikelets 2.5–3 mm long, in pairs, or clustered at each node, oblong, dorsally compressed, acute; lemmas apex obtuse, mucronate. Distribution: tropical and temperate Africa and Asia to India.

191. *Urochloa mutica* (Forsk.) T. Q. Nguyen

FIGURE 200

Urochloa mutica (Forsk.) T. Q. Nguyen, Novosti Sist. Vyssh. Rast. 1966: 13. 1966.



FIGURE 200. *Urochloa mutica.* A. Habit. B. Ligule, sheath, and blade C. Inflorescence. D. Part of inflorescence. E. Spikelets with upper (right) and lower (left) glumes. A drawn from *A. Amer 15425* (CAI); B–D drawn from *G. Schweinfurth s.n.* (US-823874), *C. Mez* (US-1649625); E modified from Wipff and Thompson (2003).

[*Brachiaria mutica* (Forssk.) Stapf]
Common names: *konya, kussein*; California grass, Carib grass, Dutch grass.

Stoloniferous perennials; sometimes stoloniferous. Culms 25–125 cm long, prostrate, sometimes rooting at the lower nodes; branching from the lower nodes; butt sheaths scarious. Leaves mostly cauline; sheaths much longer than blades, firm, terete, pubescent, margins glabrous or sparsely hairy; ligules fringe of hairs; blades 10–30 cm long, 0.3–1 cm wide, linear-lanceolate, scabrid or hirsute, margins scabrid or with tuberculate-ciliate hairs, base simple, apex acute. Inflorescence of 5–20 racemes on a central axis; racemes 2–10 cm long. Spikelets 2.5–3.5 mm long, in pairs, elliptic, dorsally compressed, acute; lemma apex obtuse, muticous or mucronate, awnless. Distribution: throughout the tropics.

192. *Urochloa orthostachys* (Mez) Ibrahim & P. M. Peterson, comb. nov.

FIGURE 201

Urochloa orthostachys (Mez) Ibrahim & P. M. Peterson, Smithsonian Contr. Bot. 108: 125. 2018.
Basionyn: *Panicum orthostachys* Mez, Notizbl. Bot. Gart. Berlin-Dahlem 7: 66. 1917 ≡ *Brachiaria orthostachys* (Mez) Clayton, Kew Bull. 20: 265. 1966. Lectotype: (**designated here**): SENEGAL. Ad aquas Walo (Wale), 1827, *F.R. Leprieur 21* (B 10 0367313 [image!]).

Caespitose annuals. Culms 20–60 cm long, geniculately ascending; culm internodes distally pubescent; nodes pubescent. Leaves basal and cauline; sheaths pubescent; ligules a fringe of hairs; blades 3–8 cm long, 2–7 mm wide, linear, flat, pubescent or densely hairy, apex acuminate. Inflorescences composed of 4–8 racemes borne along a central axis; racemes 5–10 cm long. Spikelets 2.5–3.5 mm long, solitary, elliptic, dorsally compressed, glabrous, acute; upper glumes 7-veined; lemma apex obtuse, awnless. Distribution: throughout tropical Africa.

193. *Urochloa ramosa* (L.) T. Q. Nguyen

FIGURE 202

Urochloa ramosa (L.) T. Q. Nguyen, Novosti Sist. Vyssh. Rast. 13. 1966. [*Brachiaria ramosa* (L.) Stapf]
Common name: browntop millet.

Loosely caespitose annuals. Culms 10–70 cm long, erect or decumbent; internodes glabrous or pubescent, striate; nodes

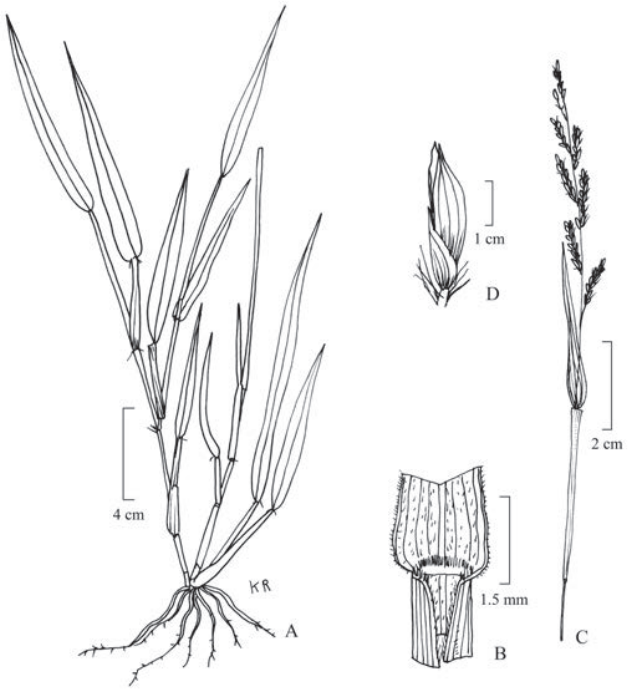


FIGURE 201. *Urochloa orthostachys*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. Laegaard* & *Sobere Traore 17902* (US-3591409).

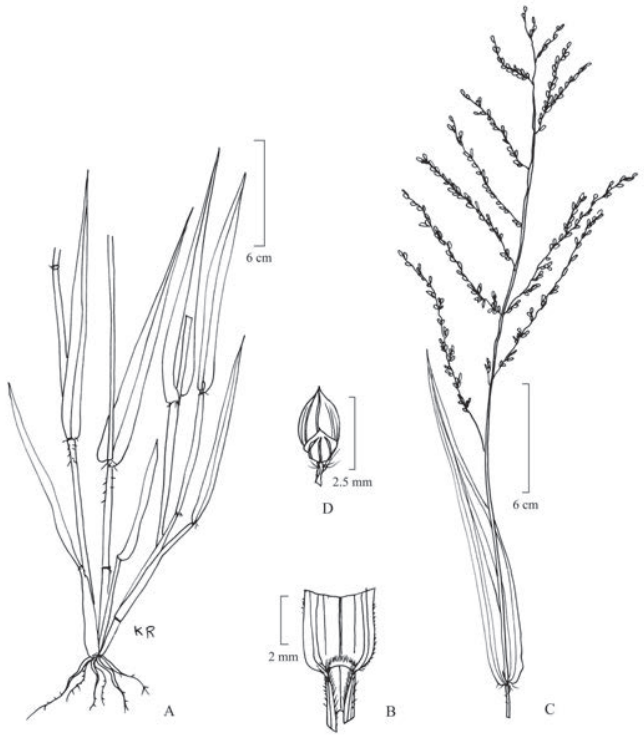


FIGURE 202. *Urochloa ramosa*. A. Habit. B. Ligule, sheath, and blade. C. Part of inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *A. P. G. Michelmore* (US-2975886).

glabrous or pubescent; a few branches arising from the lower nodes. Leaves mostly cauline; sheaths much longer than leaf blades, keeled, hairy; oral hairs present; ligules fringe of hairs; blades 2–25 cm long, 0.4–1.5 cm wide, linear or lanceolate, scabrid or sparingly hairy, base cordate, apex acute. Inflorescence of 3–15 acemes borne on a central axis; racemes 3–10 cm long. Spikelets 2.5–3.5 mm long, in pairs, elliptic to broadly elliptic; lemma apex acute, awnless. Distribution: tropical and temperate Africa, Arabia, Asia, and Western Hemisphere.

194. *Urochloa stigmatisata* (Mez) Ibrahim & P. M. Peterson, comb. nov.

FIGURE 203

Urochloa stigmatisata (Mez) Ibrahim & P. M. Peterson, Smithsonian Contr. Bot. 108: 126. 2018.

Basionym: *Panicum stigmatisatum* Mez, Bot. Jahrb. Syst. 34(1): 140. 1904 ≡ *Brachiaria stigmatisata* (Mez) Stapf, Fl. Trop. Afr. 9: 520. 1919. Holotype: SUDAN. Ghasalquellengebiet, Land der Djur, grosse Seriba Ghattas, 26 Aug 1869, *G.A. Schweinfurth 2299* (B 10 0168675 [image!]; isotypes: K000282144 [image!], W19160023469 [image!]).

Common names: *lahrba, larba, niarukeho*.

Solitary or caespitose, often mat-forming annuals with short stolons. Culms 30–60 cm long, decumbent; rooting at lower nodes. Leaves cauline; sheaths glabrous, basally compressed or keeled; ligules a fringe of hairs; blades 2.5–18 cm long, 6–12 mm wide, linear or lanceolate; flat, crenate; scabrous, margins cartilaginous, base broadly rounded, apex acute. Inflorescence composed of 1–3 racemes borne along a central axis; racemes 2–8 cm long. Spikelets 4–5 mm long, solitary, oblong, dorsally compressed, glabrous; upper glumes 9-veined; lemma apex obtuse, awnless. Distribution: tropical west, west-central, and northeast Africa.

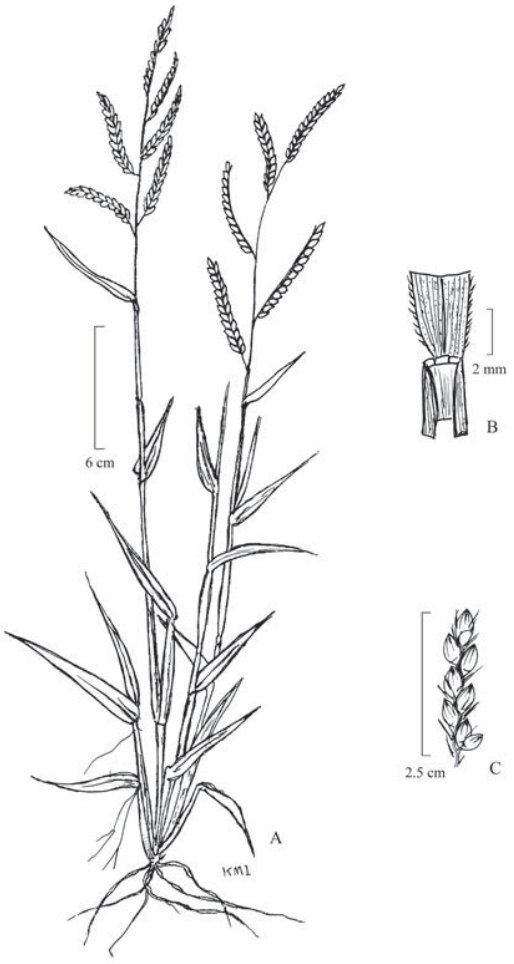


FIGURE 203. *Urochloa stigmatisata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A, C drawn from Ibrahim and Kabuye (1988); B drawn from Poilecot (1995).

195. *Urochloa trichopus* (Hochst.) Stapf

FIGURE 204

Urochloa trichopus (Hochst.) Stapf, Fl. Trop. Afr. 9: 589. 1920.

Common names: *saakat*; gonya grass, roundseed urochloa.

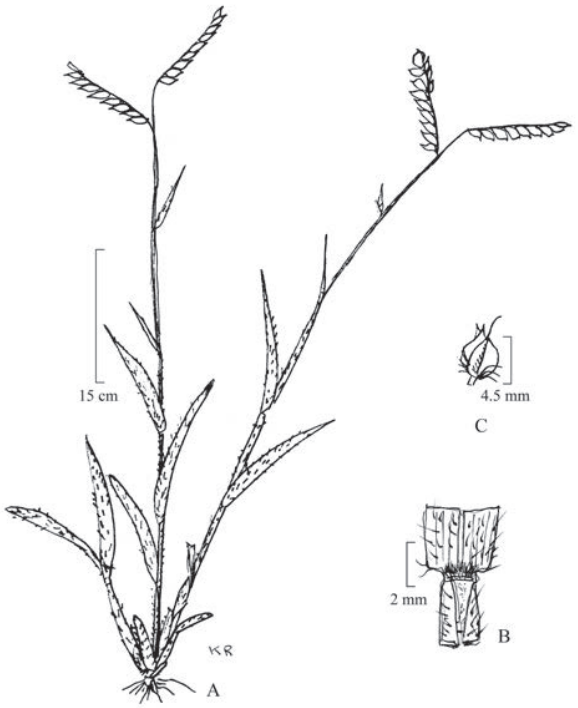


FIGURE 204. *Urochloa trichopus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *H. M. Richards 21324* (US-2537391).

Caespitose annuals. Culms 20–170 cm long, geniculately ascending or decumbent; branches arising from the mid culms; internodes glabrous; nodes pubescent; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous or pubescent, with tubercle-based hairs, ribbed, outer margins hairy; ligules fringe of hairs; blades 5–30 cm long, 0.5–2 cm wide, linear or lanceolate, glabrous or hispid with tubercle-based hairs, margins ciliate, base broadly rounded or amplexicaul, apex acute. Inflorescence with 3–20 unilateral racemes borne along a central axis; racemes 1–14 cm long, the spikelets 2-rowed. Spikelets 2.5–5.5 mm long, solitary, ovate, strongly dorsally compressed, plano-convex, apex acuminate; lemma apex obtuse, mucronate, principal lemma mucronate, the mucros 0.5–1 mm long. Distribution: Tropical and temperate Africa, Asia, and North America.

196. *Urochloa villosa* (Lam.) T. Q. Nguyen

FIGURE 205

Urochloa villosa (Lam.) T. Q. Nguyen, Novosti Sist. Vyssh. Rast. 1966: 14. 1966. [*Brachiaria villosa* (Lam.) A. Camus]
Common name: hairy signal grass.

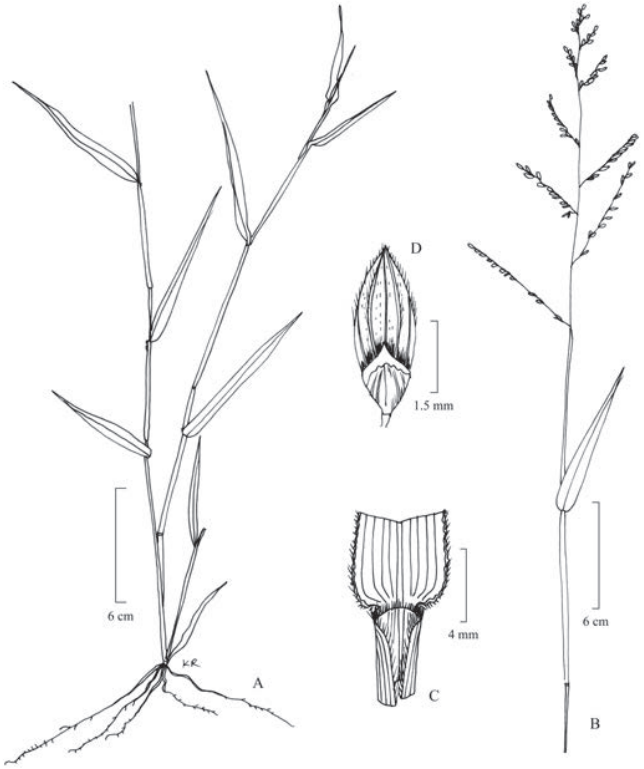


FIGURE 205. *Urochloa villosa.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *M. D. W. Jefferys 30* (US-1037965).

Loosely caespitose or creeping annuals. Culms 10–50 cm long, decumbent; branching from the base. Leaves cauline; sheaths with fine hairs, sometimes glabrous, margins hairy; ligules fringe of hairs; blades 1–7 cm long, 2–6 mm wide, lanceolate or linear-lanceolate, finely pubescent, margins cartilaginous, apex acute. Inflorescence of 5–10 racemes borne along a central axis; racemes 3–7 cm long. Spikelets 2–2.7 mm long, paired, elliptic, dorsally compressed, apex subacute or acute; lemma apex acute or apiculate, awnless. Distribution: tropical Africa and temperate Asia to India.

197. *Urochloa xantholeuca* (Hack. ex Schinz) H. Scholz

FIGURE 206

Urochloa xantholeuca (Hack. ex Schinz) H. Scholz, Bull. Mus. Natl. Hist. Nat., B, Adansonia, sér. 411: 443. 1990. [*Brachiaria xantholeuca* (Hack. ex Schinz) Stapf]
Common name: *naanama.*

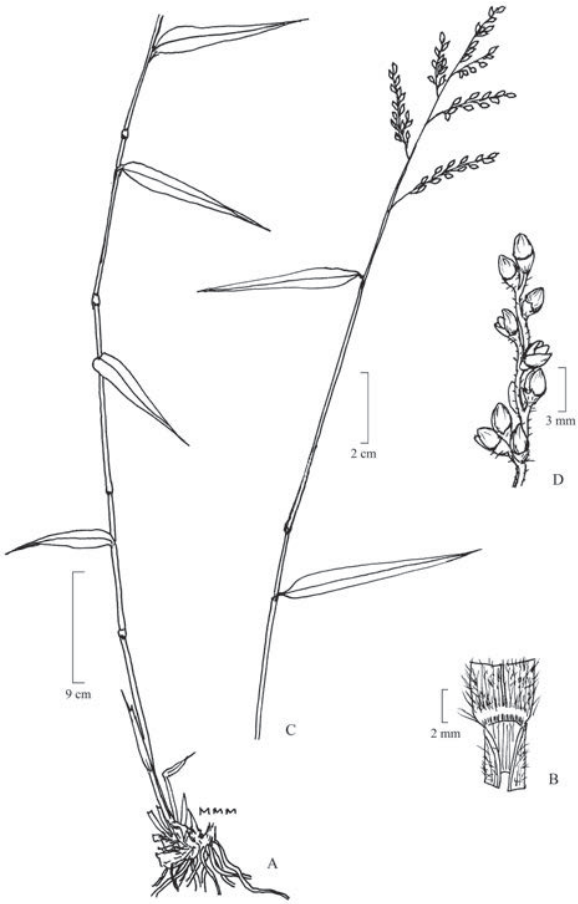


FIGURE 206. *Urochloa xantholeuca.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *H. B. Johnston 1053* (US-2975889).

Caespitose annuals. Culms 30–60 cm long, erect, geniculately ascending or decumbent, slender; rooting from lower nodes; branches arising from the base; internodes pubescent; nodes pubescent or bearded. Leaves basal and cauline; sheaths longer than blades, ribbed, velvety-hairy; ligules dense fringe of hairs; blades 3–15 cm long, 0.4–1 cm wide, broadly linear to narrowly lanceolate, softly pubescent to tomentose or velvety, margins scabrous and cartilaginous, bases broadly rounded, apex acute. Inflorescence composed of 2–8 racemes borne along a central axis; racemes 2–10 cm long. Spikelets 2.7–4 mm long, elliptic, dorsally compressed, apex acute or cuspidate; lemma apex apiculate, awnless. Distribution: tropical Africa and temperate Asia.

198. *Vossia cuspidata* (Roxb.) Griff.

FIGURE 207

Vossia cuspidata (Roxb.) Griff., Not. Pl. Asiat. 3: Index 12. 1851.
Common names: *temboro*; floating grass, hippo grass.

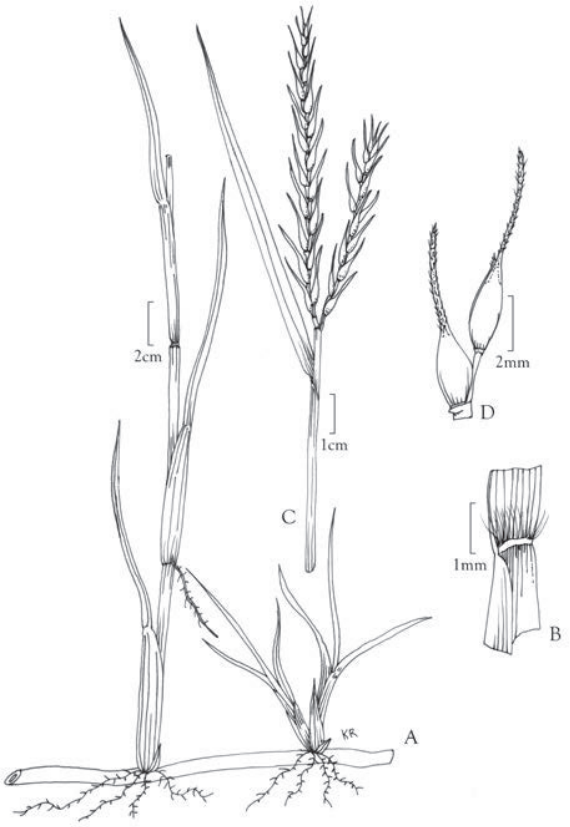


FIGURE 207. *Vossia cuspidata*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Two spikelets. A, D drawn from *Al Gadi 5* (CAI); B drawn from *Juniper & Jefford 39* (US-2473200); C modified from Ibrahim and Kabuye (1988).

Aquatic, spongy perennials with elongated rhizomes and fibrous roots. Culms up to 200 cm long, out of water, erect, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than adjacent internodes, flattened, glabrous, margins smooth; ligules 1–3 mm long, ciliolate membrane; blades 30–100 cm long, 5–20 mm wide, flat, spreading, scabrous, margins scabrous, apex attenuate. Inflorescence with 1–12 digitately inserted racemes; racemes 10–30 cm long. Spikelets 20–40 cm long, in pairs, ovate, dorsally compressed; lower glumes with a long caudate apex; lemmas awnless. Distribution: tropical Africa and India.

199. *Zea mays** L.

FIGURE 208

Zea mays L.*, Sp. Pl. 2: 971–972. 1753.
Common names: corn, maize.

Robust annuals with stilt roots; plants monoecious. Culms 2–3(–5) m tall, erect, 1–5 cm thick; internodes solid, ridged,

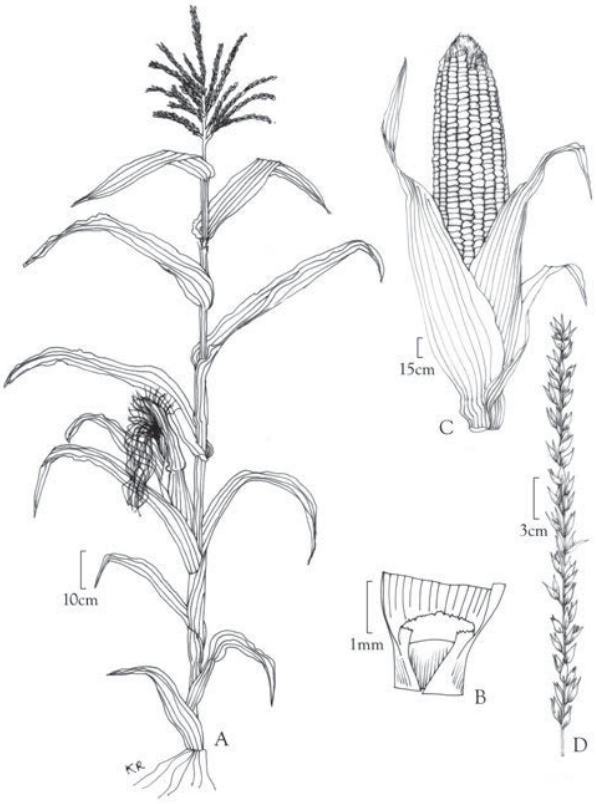


FIGURE 208. *Zea mays*. A. Habit. B. Ligule, sheath, and blade. C. Female raceme. D. Male raceme. A drawn from *El Hadidi s.n.* (CAI); B drawn from *A. S. Hitchcock s.n.* (US-727090); C unknown (US-727092); D drawn from *A. Asima 421* (US-2208997).

semiterete, glabrous; butt sheaths glabrous. Leaves cauline; sheaths longer than adjacent internodes, glabrous, ribbed, margins sparsely hairy; ligules 1–2 mm long, membranous, apex erose or lacerate; blades 30–100 cm long, 2.5–10 cm wide, flat drooping, hairy on basal ⅓, margins pubescent, bases cordate, apex acuminate. Female inflorescence axillary, subtended by one or more elliptic herbaceous spatheoles (sheaths), a cylindrical spike, 1–5(–10) cm thick with 2 or more rows of paired spikelets; male inflorescence terminal, paniculate; lemmas awnless. Habitat: cultivated fields. Distribution: originally from Mexico.

Glossary of Terms

adaxial. The side of an organ toward the axis, e.g., upper surface of a leaf. Opposite: abaxial.
adnate. Joined or united with a part or organ of a different kind, as stamens attached to petals.
adventitious root. A root that arises from any plant part other than the primary root.
ample. Large, copious; usually referring to a panicle.
amplexicaul. Used to describe a leaf blade that has a base clasping the stem.
annual. A plant that completes its life cycle from seed to maturity in one year.
apex. The tip or end point of a structure. Opposite: base.
apical. Located at the apex.
apiculate. Ending abruptly in a short, sharp point.
appressed. Keeping close to or lying flat against another organ. Compare: adnate.
aquatic. Living in water.
aristate. With a bristle at the end; stiff awned or stiff bristled.
aristulate. Bearing or terminating in a small awn or sharp bristle.
aromatic. Fragrant due to essential oils in the plant tissues.
articulate. Jointed; provided with joints or nodes where separation may naturally take place.
ascending. Rising upward and approaching erect; often used to describe branches that form an angle from the culm of less than 90°.
asymmetrical. With both sides of an organ not equal.
attenuate. Gradually tapering to a slender base or tip, long pointed.
auricle. A small, earlike appendage of the collar.
auriculate. Having an auricle; with earlike structures.
awn. A slender, bristlelike appendage ending in an organ; borne on the glume or lemma of grasses.
axil. The upper angle between a stem and its branch (or leaf).
axillary. Used in reference to structures attached in the axil.
axis. The main stem or culm, especially of an inflorescence.
barbed. With rigid points or short bristles pointing backward.
basal. At or toward the base. Opposite: apical.
bearded. With long or stiff hairs.
biennial. Taking two years of growth from seedling to maturity, usually producing only vegetative growth in the first season and flowering in the second.

bifid. Two clefts or two lobes at the tip; deeply divided into two parts.

bilateral. Two-sided, usually referring to the placement of spikelets along two sides of a branch.

bilobed. With two lobes at the tip of a lemma found in *Tristachya*.

blade. The final segment of grass leaf, above the sheath where the leaf clasps the stem.

bloom. Whitish waxy or powdery coating on a surface; see glaucous.

bract. A small modified leaf subtending pedicels or flowers; in grasses, this includes the glumes, lemma, and palea.

branch. Lateral growth from the axis.

bristle. A fine, stiff, hairlike structure; these are found subtending the spikelets of *Setaria*.

bulbous. A swollen, thickened structure often made of fleshy scales, usually at the base of a culm resembling a bulb.

bur. A spiny cluster of spikelets or fascicle that falls as a single unit.

butt sheath. The thick, basal remnant parts of leaves.

caducous. Falling off soon after formation, not persistent.

caespitose. Growing in low, tight groups or clumped; forming a tussock or tufted.

callus. A hard or firm structure; in grasses, the thick, hardened portion just below the lemma on the rachilla.

capitate. Forming headlike clusters; aggregated into a very dense or compact cluster.

cartilaginous. Hard and tough, gristly but elastic, like a cartilage.

caryopsis. A one-seeded, dry, indehiscent fruit with the seed coat adherent to the fruit wall; the grain of most grasses.

cataphyll. A scale leaf, usually on a rhizome at the base of the plant.

caudate spikelet. Having a narrow, taillike appendage; used to describe the long, linear, flattened apex of the lower glume in *Vossia*.

caudices. Short, thickened, verticillate or branched stems that are usually subterranean or at ground level; in grasses, found at the base of the culm.

cauline. Borne on or arising along the stem, compared with basal, where leaves are mainly near the base.

chartaceous. Of papery or tissuelike texture.

ciliate. Fringed with spreading stiff hairs on the margin.

ciliolate. Fringed with very small hairs, minutely ciliate.

clasping. Leaf base surrounding and touching the stem closely on two sides; see amplexicaul.

clavate. Club shaped; the wider portion at the apex.

clumped. Growing in a tight group, or caespitose.

collar. A band of tissue situated at the junction of the blade and sheath, often lighter in color than the rest of the leaf.

column. The lower twisted part of a geniculate awn, or the portion below the awn branching point in *Aristida*.

compound. Referring to inflorescences made up of a number of small constituent inflorescences (as in some Andropogonodae) or raceme or spike with some secondary branching.

compressed. Flattened, either laterally or dorsally.

concave. Hollowed out, curving inward. Opposite: convex.

conduplicate. Folded lengthwise down the middle; used when referring to a leaf blade.

confluent. Structure merging in one, or fusing.

connate. Union or fusion of like parts or organs.

constricted. Abruptly narrowed, tightened or drawn together.

contracted. A narrow, dense inflorescence, usually with appressed branches.

convex. Having a more or less rounded surface.

convolute. Rolled longitudinally; leaf blades having one edge rolled inside the other.

cordate. Shaped like a heart at the base of the leaf blades, which are often deeply notched with rounded lobes.

coriaceous. Leathery in texture.

corymbose. A flat-topped, open inflorescence where the lower branches are longer than the upper branches.

cosmopolitan. Found throughout the world.

crateriform. Saucer or cup shaped, used to describe gland shape in *Eragrostis*.

crested. With an elevated and irregular-toothed ridge.

crown. The persistent basal portion of a tufted, herbaceous, perennial grass; the region from which the culm and roots grow.

crustaceous. Of hard, thin, and brittle texture.

culm. The grass stem that will eventually bare the spikelets; also applies to sedges and rushes.

cuneate. Wedge shaped; with the acute angle at the attachment point.

cupule. An involucre composed of bracts usually adherent at the base.

cuspidate. Abruptly tipped with a sharp, rigid point, usually in reference to the apex of a leaf blade.

decumbent. Stems or culms having the basal part flat along the ground, then curving upward; reclining.

decurrent. A structure adnate to the stem with its margins extending down the stem or axis below the point of insertion; usually used to describe the sheath.

deflexed. Bent or turned abruptly outward or downward, but not to 180° (see reflexed).

dentate. Having a sharp-toothed margin, with teeth perpendicular to the margin. Compare: serrate.

depressed. More or less flattened from above.

dichotomous. With forked, paired branches or divisions of approximately equal size.

digitate. Arranged like the fingers of a hand, with the members arising from the same point; same as palmate.

disarticulate. The separation of a structure usually at a node or joint.

distant. Farther from the point of attachment. Opposite: proximal.

distichous. Two-ranked on the opposite sides of a stem or culm.

divaricate. Spreading wide apart and in different directions.

divergent. Spreading broadly, but less so than divaricate.

dorsal. The back; the face turned away from the culm axis (the term abaxial is preferable). Opposite: ventral.

eglandular. Without glands.
ellipsoid. An elliptical three-dimensional shape, more or less with identical ends.
elliptic. Shaped like an ellipse; the broadest point midway between the ends and the width about one-half the length.
emarginate. Having a shallow notch at the apex, usually in reference to a leaf blade.
entire. With an even margin without teeth.
ephemeral. A short-lived structure or organism.
erect. A plant that is quite upright, growing perpendicular to the ground.
erose. Having an irregular-toothed margin.
excurrent. Extending beyond the margin or tip.
exserted. Protruding; sticking out; projecting beyond the edge. Opposite: included.
extravaginal branching. Growth of the shoot initial when the tip emerges or breaks through or ruptures the enveloping sheath; this is usually distinguished by the occurrence of bladeless leaves found directly above the indistinct prophyllum. Opposite: intravaginal.
falcate. Sickle shaped; curved on distal end.
false spike. A very narrow panicle with spikelets borne in tight clusters on much-reduced side branches as in some species of *Setaria* and *Cenchrus*.
fascicle. A fairly tight cluster.
fascicles. Spikelike panicles of highly reduced branches forming a "bur" in *Cenchrus* and cluster of bristles in *Setaria*.
fasciculate. Leaves or branches in a cluster or tight bundle.
fastigiate branching. Branches or culms clustered or arising from a single point in a broomlike appearance; see *Hyparrhenia rufa*.
feathery. Resembling a feather.
fibrous. Furnished with fibers; often found in basal leaf sheaths.
filiform. Threadlike, long, slender, and cylindrical.
fimbriate. Fringed with long, slender hairs coarser than ciliate.
flabellate. Fanlike, applied to flattened basal leaf sheaths.
flaccid. Soft or weak, limp, wilted. Opposite: firm or stiff.
flexuous. A zigzag or wavy form; bent alternately one way then the other.
floret. A portion of a spikelet (grass inflorescence) that includes the lemma, palea, and reproductive structures.
foliaceous. Leaflike.
fulvous. Tawny, orangelike, or dull yellowish brown to nearly chestnut.
geniculate. Abruptly bent like a knee joint.
gibbous. Slightly pouched or swollen on one side.
glabrous. Without hairs or glands, but not necessarily smooth. Opposite: hairy.
gland. A secreting structure on the surface, but often used in the sense of a glandlike body; any protuberance of like nature that may not secrete.
glandular. Covered with glands.
glaucous. Covered with a grayish, whitish, or bluish waxy coating that readily rubs off.
globose. Spherical, nearly or quite globular.
globular. Spherical.
glomerate. In a compact cluster or group of clusters.
glossy. Refers to a surface that is lustrous or shinny.
glume. The bract, usually occurring in pairs, at the base of a grass spikelet.
granular. Covered in little knobs or tubercles; less pronounced than tuberculate.
habit. The general appearance of a plant.
habitat. The surroundings in which a plant grows.
hair. A cylindrical cell or a row of cells, often very fine and transparent. Synonym: trichome.
head. An inflorescence of closely packed spikelets that is more or less round.
herb. A nonwoody plant whose stem dies back to ground level at the end of the growing season.
herbaceous. Not woody, but soft and green.
heterophyllous. Having leaf blades of different sizes and shapes.
hirsute. With straight, long, coarse, and stiff hairs.
hirtellous. Minutely hirsute.
hispid. Beset with stiff hairs that are often strong enough to penetrate the skin.
hooded. Shaped like a hood or boat shaped; used to describe the leaf blade apex.
hook. A curved or bent part at the apex of a leaf blade.
hyaline. Colorless, thin and translucent or transparent.
imbricate. Partly overlapping, like the tiles of a roof.
incurved. Curving inward or bent inward.
indument. Any hairy covering or pubescence.
indumentum. A cover of hairs, scales, or bristles.
indurated. Hardened at maturity.
inflexed. Turned sharply inward.
inflorescence. The flowing part of a plant, categorized by the arrangements of flowers on the floral axis.
inflorescence unit. Term used to describe pairs of spikelets in the supertribe Andropogonodae, usually consisting of one sessile and one or two pedicellate spikelets.
innovation. A new vegetative shoot in a perennial grass.
inserted. Growing upon or attached to.
internode. The portion of the stem or culm between two nodes.
interrupted. When continuity is broken, particularly in dense inflorescence whose form is not continuous.
intravaginal branching. Growth of the shoot initial within the sheath that envelops the node; usually distinguished by the absence of bladeless leaves and development of an obvious, often palealike prophyllum. Opposite: extravaginal.
involute. Rolled from both margins toward the middle; the upper surface within; especially common in leaf blades.
joint. Node of the culm or internode of an inflorescence.
keel. The adaxial ridge or fold of a compressed sheath, blade, glume, lemma, or palea.
keeled. Ridged along the middle of a flat or convex surface.
key. An ordered series of alternatives used to facilitate the identification of organisms.

knee. An abrupt bend in a stem or culm.
lacerate. Torn at the margin or irregularly lobed, as if torn.
lamina. The flat part of a leaf. Synonym: leaf blade.
lanate. With a very dense, wooly indumentum of hairs.
lanceolate. Lance shaped; narrow, tapering at both ends with the broadest part below the middle, approximately three times longer than wide.
lateral. Relating to the side of an organ or structure.
lax. Loose, distant, and not crowded together. Opposite: congested.
leaf blade. The upper expanded part of the leaf beyond the leaf sheath.
leaf sheath. The lower part of the leaf clasping the adjacent part of the grass stem and terminating at a node below.
lemma. The lower (outer) of two bracts enclosing the grass flower; together with palea constitutes a floret.
ligule. An appendage (membrane) or ring of hairs on the adaxial leaf surface at the junction of the sheath and blade.
limb. The distant untwisted part of a geniculate awn above the column.
linear. Long and narrow with parallel margins, more than 10 times longer than wide; usually refers to the shape of the leaf blade.
lobed. A flat organ split in two or more subdivisions.
lobule. A small lobe.
loose. Refers to the branching pattern of inflorescences that are often open, but not dense or compact.
marginal. At or near the edge.
membranous. Thin, soft tissue, usually green or translucent; similar to a thin membrane.
midrib. The central vascular trace or vein in the leaf blade.
mucronate. A short, small, abrupt point (mucro) or minute awn less than 1 mm in length.
muricate. Rough, with short, hard points.
muticous. Blunt and without a mucro or awn.
nerve. A vein or vascular trace, often raised, usually running longitudinally on blades, glumes, and lemmas.
node. Point on the stem or culm axis at which leaves or branches originate; usually, these are swollen or knoblike.
notched. V-shaped cut from an entire edge.
oblique. Pertains to base of leaf blades where two sides of the lamina are unequal.
oblong. Longer than broad, with the margins nearly parallel.
obovate. Reversed ovate, inverted ovate, the broadest part near the apex and the narrow side near the base.
obovoid. Egg shaped, but with the broadest part near the apex and the narrowest part near the base.
obtuse. With a blunt or rounded apex.
oral hairs or setae. Hairs on the margin of the distal end of leaf sheath; hairs adjacent to the ligule auricular region.
orbicular. Disk shaped, flat with a circular outline.
ovate. The shape of a longitudinal section of an egg, the broader end below the middle.
ovoid. Egg shaped.
palea. The inner or upper bract enclosing the pistil and stamens of a grass.
pallid. Pale in color.
panicle. An inflorescence in which the main axis has several divided or subdivided branches.
paniculate. Resembling a panicle.
papillose. Bearing minute nipplelike projections.
pectinate. Comblike, with very close narrow divisions or parts.
pedicel. The stalk of an individual flower in an inflorescence; in grasses the stalk of a spikelet.
pedicellate. Borne on a pedicel.
peduncle. The stalk of an inflorescence or cluster of spikelets.
pedunculate. With a foot-stalk or peduncle.
perennial. A plant living for more than two years.
perfect. A floret (flower) with functional stamens and pistil.
persistent. Remaining attached, not falling off.
petiole. The stalk of a leaf blade.
pilose. Covered with loose, soft, long, straight hairs, not dense but somewhat shaggy.
pit glands. Small glandular depressions common on some species of *Eragrostis*.
plane. Level, flat surface.
pleated. Folded; see plicate.
plicate. Folded into pleats lengthwise several times, like a fan.
plumose. Covered with long, spreading, soft hairs, with each hair having side hairs along the main axis, like the plume of a feather.
procumbent. Prostrate, trailing or lying flat, usually not rooting at nodes. Compare: stolon.
prophyllum. An initial, usually two-keeled, bladeless, adaxial, protective bract surrounding an axillary vegetative or floral bud; usually well developed in intravaginal branching shoots.
prostrate. Lying flat on the ground.
puberulent. Minutely pubescent, with very short hairs barely visible to the eye.
pubescent. A generalized term for hairy; lacking definition of the type of hairs, but sometimes referring to fine short hairs.
punctate. With transparent or colored dots, depressions, or pits.
pungent. Ending in a rigid, sharp point.
pyriform. Pear shaped; used to describe grains of some species of *Eragrostis*.
raceme. A portion of an inflorescence with the spikelets borne on pedicels directly on the axis or peduncle; racemes may be solitary, digitate, or scattered.
racemose. Arranged like a raceme.
rachilla. The branching axis of the spikelet that bear florets.
rachis. The axis of an inflorescence that bares spikelets.
rame. A compound inflorescence in the supertribe Andropogonodae consisting of one to many units (branches) of one sessile and one or two pedicellate spikelets.
rectangular-prismatic. Having six more or less flat surfaces, such as a brick; used to describe the grain in *Eragrostis*.
reedlike. A semipersistent, aboveground stem that is not woody and is generally unbranched except in the inflorescence; in

grasses this refers to stems that are large, usually more than 2 m tall.

reflexed. Abruptly curved or bent downward or backward to about 180°; see deflexed.

retrorse. Marginal spines or barbs bent abruptly downward or backward (away from the apex). Opposite: antrorse.

revolute. Rolled or curled toward the abaxial (lower) surface. Opposite: involute.

rhizome. An underground stem, differing from a true root in the presence of buds or scalelike leaves.

rib. A prominent vein, usually on a leaf.

ridged. Having raised veins.

rootstock. A short, vertical, subterranean stem, bearing roots.

rosette. A spreading and radiating basal cluster of leaves at ground level.

rostrate. With a beak, narrowed into a slender tip or point.

rounded. Smoothly curved without sharp angles. Synonym: obtuse.

rudimentary. Imperfectly or incompletely developed; vestigial and usually nonfunctional.

rufous. Rusty or brownish red.

rugose. Covered with wrinkles or creased surface.

rugulose. Finely wrinkled; diminutive of rugose.

runner. A creeping or prostrate lateral shoot; a very slender or filiform stolon.

sagittate. Shaped like an arrowhead; used to describe the base of a leaf blade that has two acute lobes that point backward.

scaberulous. Minutely scabrous, slightly rough.

scabrid. Rough to touch, usually caused by the presence of minute teeth or scattered short, stiff, broad-based hairs.

scabrous. Rough or harsh to touch, usually from short, stiff, broad-based hairs.

scales. Thin, dry, flat, almost leaflike structure protecting the rhizome or shoots.

scarious. Small, thin, dry, and shriveled, not green.

secund. One-sided; as when all branches or spikelets are borne to the same side of the axis.

sensu lato. A Latin phrase meaning "in a broad sense" (abbreviated s.l.).

sensu stricto. A Latin phrase meaning "in a narrow sense" (abbreviated s.s.).

sericeous. Silky, with closely appressed, soft, straight hairs.

serrate. Sharp toothed and angled, like a saw edge, with the teeth directed toward the apex.

serrulate. Serrate, with minute teeth.

sessile. Without stalk or pedicel.

seta. A bristle or stiff hair (pl. setae).

setaceous. Stiff and narrow, bristlelike.

setose. Bristly, beset with bristles.

sheath. A more or less tubular structure surrounding an organ or part, as the lower part of a grass leaf that wraps around the stem.

silky. A condition produced by a cover of soft, long, straight, fine hairs.

simple. Composed of not more than one anatomically or morphologically identical unit; not compound.

sinuous. Strongly wavy. Compare: undulate.

sinus. The notch between two lobes of a leaf or apex of a lemma.

slender. Slim, thin.

smooth. Referring to surfaces that are not rough, sometimes loosely used for the absence of hairs.

solitary. Borne singly or alone.

spathe. A leafy bract (in grasses formed by the sheath) that supports the branches of a spatheate inflorescence.

spatheate. With spathes or spatheoles.

spatheolate. Having spatheoles.

spatheole. A leafy bract (spathe) enclosing part of an inflorescence. In grasses, the leafy bract is usually the sheath.

spatulate. Spoon or spatula shaped.

spicate. With spikes, spikelike, or disposed in a spike.

spiciform. Spikelike, in the form of a spike.

spike. An inflorescence or branch with sessile spikelets on an axis; spikes may be solitary, digitate, or scattered.

spikelet. The unit of the inflorescence in grasses, consisting of two glumes and one or more florets; a diminutive of spike.

spine. A hard, sharp-pointed structure, often long and narrow.

spinose. Spiny or spinelike.

spinulose. With small spine; diminutive of spinose.

spreading. Referring to branches of an inflorescence having an outward direction at about right angles to the main axis.

stipe. A stalk to an organ that is part of the organ itself and not a separate branch.

stilt-root. Adventitious roots from the lower nodes of the culms.

stolon. A modified stem above ground (runner) that creeps and roots at the nodes and can give rise to new plants.

stoloniferous. Bearing stolons.

striate. With numerous longitudinal and parallel fine grooves, ridges, or lines of color.

strigose. With appressed, stiff, rather short hairs.

sub-. A prefix to denote somewhat, slightly, or to a lesser degree; as in subacute, subdigitate, suberect, subglabrous, subsessile, subspicate, and subobtuse.

subdigitate. With inflorescence branches arising predominantly at the one point (apex), but with one or a few branches clearly arising below these.

subtend. To be below and yet close to; to extend under another structure.

subulate. Awl shaped, very narrow and tapering to a fine tip from a broader base.

tapering. Gradually narrowing in width toward one end, not abrupt.

taxon. Any taxonomic unit into which living organisms are classified, such as species, genus, tribe, subfamily, or family.

terete. Circular in cross section, lacking grooves or ridges.

terminal. At the end of a branch, stem, or culm axis.

ternate. Arranged in a cluster of three.

tiller. A leafy, nonflowering shoot initiating from the base of the plant.

tomentose. Densely covered with matted, soft wool-like hairs.
toothed. Having teethlike protrusions.
tough. Not disarticulating. Opposite: fragile.
truncate. Ending abruptly; cut squarely; with the apex flat as if cut across at the top.
tubercle. A small, rounded protruding body; a little tuber.
tuberculate. Furnished with small projections or tubercles.
tufted. Clustered, or clumped. Synonym: caespitose.
turgid. Swollen, inflated.
tussock. A tough, dense tuft of basal leaves found in perennial grasses (see caespitose).
undulate. Gently wavy. Compare: sinuous.
unilateral. One-sided, usually referring to the placement of spikelets along one side of a branch.
utricle. A small bladderlike, one-seeded indehiscent fruit used to describe the globose-ovoid, bony, shining utricle enclosing the one-flowered spikelet of *Coix lacryma-jobi*.
vein. A strand of vascular tissue (a vascular bundle) usually found in leaves, glumes, lemmas, and paleae.
venation. The arrangement of the vascular bundles or veins in a leaf.
vernal. Occurring in the spring.
verrucose. Having a wartlike or nodular surface.
verticillate. Arranged in whorls.
villous. Densely covered with long, weak, silky, often curly hairs.
viscid. Sticky or gluelike.
viscous. Glutinous, or very sticky.
wanting. Lacking.
wart. A hard or firm excrescence.
webbed. A tuft of cottonlike hairs found just below the lemma in some species in the tribe Poeae.
whorl. Three or more structures arranged in a circular manner around a common insertion point.
whorled. Having whorls.
winged. With a thin projection or border resembling a wing.
wiry. Like a wire, thin and cylindrical.
woolly. Hairy with dense, long, soft, entangled, curled hairs not appressed to the surface. Synonym: lanate.

References

Allen, C. M. 2003. 25.21 *Paspalidium* Stapf. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2*, M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 558–560, *Flora of North America North of Mexico*. Oxford University Press, New York.

Barkworth, M. E. 2003. 26.08 *Sorghum* Moench. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2*, M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 626–630, *Flora of North America North of Mexico*. Oxford University Press, New York.

Baum, B. R. 2007. 14.52 *Avena* L. In *Volume 24: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 1,* M. E. Barkworth, K. M. Capels, S. Long, L. K. Anderton, and M. B. Piep, eds., pp. 734–739, *Flora of North America North of Mexico*. Oxford University Press, New York.

Bentham, G. 1881. Notes on Gramineae. *Botanical Journal of the Linnean Society* 19: 14–134. https://doi.org/10.1111/j.1095-8339.1881.tb00355.x.

Bogdan, A.V. 1977. *Tropical Pasture and Fodder Plants*. Longman, London.

Brown, R. 1814. Gramineae. In *A Voyage to Terra Australis*, M. Flinders, ed., pp. 580–583. W. Blumer, London.

Clayton, W. D. 1970a. Gramineae. In *(Part 1) Flora of Tropical East Africa*. Crown Agents for Overseas Governments and Administrations, London.

Clayton, W. D. 1970b. Gramineae. In *(Part 2) Flora of West Tropical Africa*. Crown Agents for Overseas Governments and Administrations, London.

Clayton, W. D., S. M. Phillips, and S. A. Renvoize. 1974. Gramineae. In *(Part 2) Flora of Tropical East Africa.* Crown Agents for Overseas Governments and Administrations, London.

Clayton, W. D., and S. A. Renvoize. 1982. Gramineae. In *(Part 3) Flora of Tropical East Africa*, Crown Agents for Overseas Governments and Administrations, London.

Clayton, W. D., M. S. Vorontsova, K. T. Harman, and H. Williamson. 2006. GrassBase—The Online World Grass Flora. http://www.kew.org/data/grasses-db.html (accessed October 2016).

Cope, T. 1999. Gramineae (Arundineae, Eragrostideae, Leptureae and Cynodonteae). In *Flora Zambesiaca,* G.V. Pope, ed., pp. 1–261. Royal Botanic Gardens, Kew, Didcot, UK.

Cope, T. A. 2005. Gramineae. In *Flora of Egypt, Monocotyledons,* Vol. 4, L. Boulos, ed., pp. 124–349. Al Hadara Publishing, Cairo.

Freckman, R. W., and M. G. Lelong. 2003. 25.10 *Panicum* L. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 450–488, *Flora of North America North of Mexico*. Oxford University Press, New York.

Hatch, S. L. 2003. 17.29 *Dactyloctenium* Willd. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 112–114, *Flora of North America North of Mexico*. Oxford University Press, New York.

Hilu, K. W. 2003. 17.27 *Eleusine* Gaertn. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 109–110, *Flora of North America North of Mexico*. Oxford University Press, New York.

Hitchcock, A. S. 1951. *Manual of the Grasses of the United States*, 2nd ed., revised by A. Chase. United States Department of Agriculture Miscellaneous Publication 200: 1–1051. https://doi.org/10.5962/bhl.title.65332.

Ibrahim, K. M., H. A. Hosni, and P. M. Peterson. 2016. *Grasses of Egypt*. Smithsonian Contributions to Botany 103: 1–201. https://doi.org/10.5479/si.19382812.103.

Ibrahim, K. M., and C. H. S. Kabuye 1988. *An Illustrated Manual of Kenya Grasses*. Food and Agricultural Organization of the United Nations, Rome.

Mayaux, P., E. Bartholomé, S. Fritz, and A Belward. 2004. A New Land-Cover Map of Africa for the Year 2000. *Journal of Biogeography* 31: 861–877. https://doi.org/10.1111/j.1365-2699.2004.01073.x.

Michael, P. W. 2003. 25.07 *Echinochloa* P. Beauv. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 390–403, *Flora of North America North of Mexico*. Oxford University Press, New York.

Morrison, L. A. 2007. 13.08 *Triticum* L. In *Volume 24: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 1,* M. E. Barkworth, K. M. Capels, S. Long, L. K. Anderton, and M. B. Piep, eds., pp. 268–277, *Flora of North America North of Mexico*. Oxford University Press, New York.

Muller, M. A. N. 1984. *Grasses of South West Africa/Namibia*. Directorate of Agriculture and Forestry, Windhoek, Namibia.

Peterson, P. M. 2003. 17.23 *Eragrostis* Wolf. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 65–105, *Flora of North America North of Mexico*. Oxford University Press, New York.

Peterson, P. M., K. Romaschenko, N. P. Barker, and H. P. Linder. 2011. Centropodieae and *Ellisochloa*, a New Tribe and Genus in the Chloridoideae (Poaceae). *Taxon* 60: 1113–1122. http://www.ingentaconnect.com/content/iapt/tax/2011/00000060/00000004/art00014.

Peterson, P. M., K. Romaschenko, and Y. Herrera Arrieta. 2014a. A Molecular Phylogeny and Classification of the Cteniinae, Farragininae, Gouiniinae, Gymnopogoninae, Perotidinae, and Trichoneurinae (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 63: 275–286. https://doi.org/10.12705/632.35.

Peterson, P. M., K. Romaschenko, and Y. Herrera Arrieta. 2015. A Molecular Phylogeny and Classification of the Eleusininae with a New Genus, *Micrachne* (Poaceae: Chloridoideae: Cynodonteae). *Taxon* 64: 445–467. https://doi.org/10.12705/643.5.

Peterson, P. M., K. Romaschenko, and Y. Herrera Arrieta. 2016. A Molecular Phylogeny and Classification of the Cynodonteae (Poaceae: Chloridoideae) with Four New Genera: *Orthacanthus*, *Triplasiella*, *Tripogonella*, and *Zaqiqah*; Three New Subtribes: Dactylocteniinae, Orininae, and Zaqiqahinae; and a Subgeneric classification of *Distichlis*. *Taxon* 65: 1263–1287. https://doi.org/10.12705/656.4.

Peterson, P. M., R. Romaschenko, and Y. Herrera Arrieta. 2017. Four New Subtribes: Allolepiinae, Jouveinae, Kaliniinae, and Sohnsiinae in the Cynodonteae (Poaceae: Chloridoideae). *Phytoneuron* 2017-44: 1–9. http://www.phytoneuron.net/2017Phytoneuron/44PhytoN-ChloridoidSubtribes.pdf.

Peterson, P. M., K. Romaschenko, Y. Herrera Arrieta, and J. M. Saarela. 2014b. A Molecular Phylogeny and New Subgeneric Classification of *Sporobolus* (Poaceae: Chloridoideae: Sporobolinae). *Taxon* 63: 1212–1243. https://doi.org/10.12705/636.19.

Peterson, P. M., K. Romaschenko, Y. Herrera Arrieta, and J. M. Saarela. 2014c. (2332) Proposal to Conserve the Name *Sporobolus* against *Spartina, Crypsis*, *Ponceletia*, and *Heleochloa* (*Poaceae, Chloridoideae, Sporobolinae*). *Taxon* 63: 1373–1374. https://doi.org/10.12705/636.23.

Peterson, P. M., K. Romaschenko, and G. Johnson. 2010. A Classification of the Chloridoideae (Poaceae) based on Multi-Gene Phylogenetics Trees. *Molecular Phylogenetics and Evolution* 55(2): 580–598. https://doi.org/10.1016/j.ympev.2010.01.018.

Peterson, P. M., K. Romaschenko, N. Snow, and G. Johnson. 2012. A Molecular Phylogeny and Classification of *Leptochloa* (Poaceae: Chloridoideae: Chlorideae) *sensu lato* and Related Genera. *Annals of Botany* 109: 1317–1329. https://doi.org/10.1093/aob/mcs077.

Peterson, P. M., K. Romaschenko, and R. J. Soreng. 2014d. A Laboratory Guide for Generating DNA Barcodes in Grasses: A case study of *Leptochloa* s.l. (Poaceae: Chloridoideae). *Webbia* 69 (1): 1–12. https://doi.org/10.1080/00837792.2014.927555.

Poilecot, P. 1995. Les Poaceae du Cote-d'Ivoire: manuel illustre d'identification des especes. *Boissiera* 50: 1–734.

Poilecot, P. 1999. Les Poaceae du Niger: description, illustration, écologie, utilisations. *Boissiera* 56: 1–766.

Quattrocchi, U. 2006. *CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms and Etymology*. 3 vols. CRC Press, Boca Raton, Fla. https://doi.org/10.1201/9781420003222.

Romaschenko, K., P. M. Peterson, R. J. Soreng, N. Garcia-Jacas, O. Futorna, and A. Susanna. 2012. Systematics and Evolution of the Needle Grasses (Poaceae: Pooideae: Stipeae) based on Analysis of Multiple Chloroplast Loci, ITS, and Lemma Micromorphology. *Taxon* 61: 18–44. http://www.ingentaconnect.com/content/iapt/tax/2012/00000061/00000001/art00002.

Rominger, J. M. 2003. 25.20 *Setaria* P. Beauv. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 539–588, *Flora of North America North of Mexico*. Oxford University Press, New York.

Rose Innes, R. 1977. *A Manual of Ghana Grasses*. Ministry of Overseas Development. Surrey, UK.

Saarela, J. M., P. M. Peterson, and J. Valdés-Reyna. 2014. A Taxonomic Revision of *Bromus* (Poaceae: Pooideae; Bromeae) in México and Central America. *Phytotaxa* 185: 1–147. https://doi.org/10.11646/phytotaxa.185.1.1.

Scholz, H., and U. Scholz. 1983. Flore descriptive de Cyperacees et Graminees du Togo. Strauss and Cramer, Hirschberg, Germany.

Soreng, R. J., G. Davidse, P. M. Peterson, F. O. Zuloaga, E. J. Judziewicz, T. S. Filgueiras, and O. Morrone. 2017a. *Catalogue of New World Grasses (Poaceae)*. http://www.tropicos.org/Project/CNWG (accessed 15 August 2017).

Soreng, R. J., P. M. Peterson, K. Romaschenko, G. Davidse, J. K. Teisher, L. G. Clark, P. Barberá, L. J. Gillespie, and F. O. Zuloaga. 2017b. A Worldwide Phylogenetic Classification of the Poaceae (Gramineae) II: An Update and a Comparison of Two 2015 Classifications. *Journal of Systematics and Evolution* 55(4): 259–290. https://doi.org/10.1111/jse.12262.

Stanfield, D. P. 1970. *The Flora of Nigeria. Grasses*. Ibadan University Press, Ibadan, Nigeria.

Townron, J. E. S. 1959. *Some Grasses of South Western Nigeria*. Ibadan University Press, Ibadan, Nigeria.

United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). https://plants.usda.gov/java/ (Accessed 15 April 2017).

Wipff, J. K. 2003a. 25.01 *Digitaria* Haller. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 358–383, *Flora of North America North of Mexico*. Oxford University Press, New York.

Wipff, J. K. 2003b. 17.52 *Tragus* Haller. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 278–281, *Flora of North America North of Mexico*. Oxford University Press, New York.

Wipff, J. K., and R. A. Thompson. 2003. 25.13 *Urochloa* P. Beauv. In *Volume 25: Magnoliophyta: Commelinidae (in Part): Poaceae, Part 2,* M. E. Barkworth, K. M. Capels, S. Long, and M. B. Piep, eds., pp. 492–507, *Flora of North America North of Mexico*. Oxford University Press, New York.

Index of Common Names (Mali)

The description number and scientific name are included in parentheses for reference.

abora (163. *Sorghum bicolor*), 110
afazo (136. *Panicum turgidum*), 95
afer (165. *Sporobolus helvolus*), 111
afezu (136. *Panicum turgidum*), 95
ainguiem (113. *Leptothrium senegalense*), 84
akaru (190. *Urochloa lata*), 124
akasof (190. *Urochloa lata*), 124
allomoze (16. *Aristida adscensionis*), 33
allomoze (155. *Sehima ischaemoides*), 106
aluala (78. *Echinochloa stagnina*), 65
amadzarne (25. *Aristida sieberiana*), 37
aseral (76. *Echinochloa colona*), 63

babunsi (40. *Chloris pilosa*), 45
bahure (126. *Oryza longistaminata*), 90
balbaldi (133. *Panicum laetum*), 94
bama subu (134. *Panicum repens*), 94
bambari ladde (103. *Hackelochloa granularis*), 78
ban ngassan (189. *Urochloa jubata*), 123
barobia (139. *Paspalum scrobiculatum*), 97
beurgu (167. *Sporobolus spicatus*), 114
birbou (78. *Echinochloa stagnina*), 65
bo (128. *Oxytenanthera abyssinica*), 91
burdi (154. *Schoenefeldia gracilis*), 105
burdi (169. *Sporobolus pyramidalis*), 113
burugal (54. *Dactyloctenium aegyptium*), 53

cram-cram (32. *Cenchrus biflorus*), 41

dakhn (31. *Cenchrus americanus*), 41
debbo daneya (67. *Digitaria gayana*), 59
dedu ia (122. *Oropetium aristatum*), 88
dedu ia (123. *Oropetium capense*), 88
dedu na (122. *Oropetium aristatum*), 88
dedu na (123. *Oropetium capense*), 88
dedu ya (122. *Oropetium aristatum*), 88
dedu ya (123. *Oropetium capense*), 88
dianacare (128. *Oxytenanthera abyssinica*), 91
diivoonu (2. *Acroceras amplectens*), 25
dugu konsina (120. *Microchloa indica*), 87
dugun bee (16. *Aristida adscensionis*), 33

ebanau (33. *Cenchrus ciliaris*), 42
ebastan (55. *Dichanthium annulatum*), 54

fani (65. *Digitaria exilis*), 58
farka teli (77. *Echinochloa pyramidalis*), 64
fingui (77. *Echinochloa pyramidalis*), 64
firala nkasan (117. *Loudetia togoensis*), 86
firri (113. *Leptothrium senegalense*), 84
fitirde (89. *Eragrostis cilianensis*), 70
fitti fitti (91. *Eragrostis gangetica*), 71
fukobi (120. *Microchloa indica*), 87
furala (154. *Schoenefeldia gracilis*), 105

gague (67. *Digitaria gayana*), 59
gansegui (169. *Sporobolus pyramidalis*), 113
gauri (163. *Sorghum bicolor*), 110
gemah (185. *Triticum aestivum*), 121
ghonya (132. *Panicum fluviicola*), 93
gombi (109. *Imperata cylindrica*), 81
gombi sogo (117. *Loudetia togoensis*), 86
gondnema (80. *Eleusine indica*), 66
gonya (132. *Panicum fluviicola*), 93
guelori (10. *Andropogon gayanus*), 30

habinni (33. *Cenchrus ciliaris*), 42
halkama (185. *Triticum aestivum*), 121
handu nkasan (189. *Urochloa jubata*), 123
heskanit (37. *Cenchrus prieurii*), 44
holu (19. *Aristida funiculata*), 34
hori (3. *Alloteropsis paniculata*), 26
hudo belle (76. *Echinochloa colona*), 63

ichiban (190. *Urochloa lata*), 124
iufane (129. *Panicum anabaptistum*), 92

kafini (164. *Sporobolus festivus*), 111
kamere (81. *Elionurus elegans*), 67

kasso (19. *Aristida funiculata*), 34
keenie ana (54. *Dactyloctenium aegyptium*), 53
kelbi (22. *Aristida mutabilis*), 36
kiki (53. *Cynodon dactylon*), 52
kilaburu (81. *Elionurus elegans*), 67
kononi (164. *Sporobolus festivus*), 111
konya (191. *Urochloa mutica*), 125
kore (128. *Oxytenanthera abyssinica*), 91
kulumbi (120. *Microchloa indica*), 87
kumo ara pilu (124. *Oryza barthii*), 89
kussein (187. *Urochloa arrecta*), 122
kussein (191. *Urochloa mutica*), 125

lahrba (194. *Urochloa stigmatisata*), 126
laki davangel (158. *Setaria pumila*), 107
larba (194. *Urochloa stigmatisata*), 126
lemmad (52. *Cymbopogon schoenanthus*), 52

malo (127. *Oryza sativa*), 90
mbonsi (40. *Chloris pilosa*), 45
musa ladel (62. *Digitaria debilis*), 57

naanama (197. *Urochloa xantholeuca*), 127
narkata (62. *Digitaria debilis*), 57
ndiga (126. *Oryza longistaminata*), 90
neanso (108. *Hyperthelia dissoluta*), 80
ngoriri (103. *Hackelochloa granularis*), 78
nguon (10. *Andropogon gayanus*), 30
ngwose (87. *Eragrostis atrovirens*), 70
niari (2. *Acroceras amplectens*), 25
niarukeho (194. *Urochloa stigmatisata*), 126
niepoto (144. *Sacciolepis africana*), 99
nion (163. *Sorghum bicolor*), 110
nkasan (117. *Loudetia togoensis*), 86
nornaba (160. *Setaria verticillata*), 108
ntaso (108. *Hyperthelia dissoluta*), 80

okras (22. *Aristida mutabilis*), 36
okras (25. *Aristida sieberiana*), 37
okras (56. *Dichanthium foveolatum*), 54

paguire jaule (99. *Eragrostis tremula*), 75
paguiri (133. *Panicum laetum*), 94
paguiri (188. *Urochloa deflexa*), 123
paguiri mayo (129. *Panicum anabaptistum*), 92
parkatari (139. *Paspalum scrobiculatum*), 97

saakat (195. *Urochloa trichopus*), 126
saana voonu ana (69. *Digitaria longiflora*), 60
sabi (81. *Elionurus elegans*), 67
samba gambi (89. *Eragrostis cilianensis*), 70
samu saana (48. *Ctenium elegans*), 49
shakatee (165. *Sporobolus helvolus*), 111
so pegou (80. *Eleusine indica*), 66
sorgobo (90. *Eragrostis ciliaris*), 71
soyo (109. *Imperata cylindrica*), 81
subu (3. *Alloteropsis paniculata*), 83
subu (90. *Eragrostis ciliaris*), 71
suebee (129. *Panicum anabaptistum*), 92

taberimt (52. *Cymbopogon schoenanthus*), 52
tadjemait (176. *Tetrapogon cenchriformis*), 117
tadjit (91. *Eragrostis gangetica*), 71
tau (65. *Digitaria exilis*), 58
teloloud (26. *Aristida stipoides*), 38
telolud (26. *Aristida stipoides*), 38
temboro (198. *Vossia cuspidata*), 128
tirichit (56. *Dichanthium foveolatum*), 54
tirikit (56. *Dichanthium foveolatum*), 54

ulu ndenku (158. *Setaria pumila*), 107
urga (154. *Schoenefeldia gracilis*), 105
uzak (32. *Cenchrus biflorus*), 41

wara (14. *Andropogon tectorum*), 32
wesedj (37. *Cenchrus prieurii*), 44
wolo gaman (94. *Eragrostis pilosa*), 73
wolo kaman (48. *Ctenium elegans*), 49
wolo kaman (49. *Ctenium newtonii*), 50
wolo kaman (94. *Eragrostis pilosa*), 73
wolo kaman (99. *Eragrostis tremula*), 75

yagué yagué ba (188. *Urochloa deflexa*), 123

zozobu (53. *Cynodon dactylon*), 52

Index of Common Names (English)

The description number and scientific name are included in parentheses for reference.

African rice (126. *Oryza longistaminata*), 90
angle grass (177. *Themeda triandra*), 117
Angleton grass (55. *Dichanthium annulatum*), 54
annual bristle grass (16. *Aristida adscensionis*), 33
antelope grass (77. *Echinochloa pyramidalis*), 64
ants millet (101. *Eriochloa fatmensis*), 77
Asian rice (127. *Oryza sativa*), 90

Bahama grass (53. *Cynodon dactylon*), 52
bamboo grass (61. *Digitaria ciliaris*), 56
basket grass (121. *Oplismenus hirtellus*), 87
basket grass (136. *Panicum turgidum*), 95
Batavian quick grass (104. *Hemarthria altissima*), 79
Bermuda grass (53. *Cynodon dactylon*), 52
besem grass (116. *Loudetia simplex*), 85
biloela buffel grass (33. *Cenchrus ciliaris*), 42
Bindura bamboo (128. *Oxytenanthera abyssinica*), 91
bird's broom (164. *Sporobolus festivus*), 111
black fonio (65. *Digitaria exilis*), 58
black-seed crab grass (69. *Digitaria ternata*), 61
black-seed finger grass (69. *Digitaria ternata*), 61
blue buffalo grass (33. *Cenchrus ciliaris*), 42
blue grass (177. *Themeda triandra*), 117
blue panic (130. *Panicum antidotale*), 92
blue panicum (130. *Panicum antidotale*), 92
bottle brush grass (15. *Anthephora pubescens*), 32
bread wheat (185. *Triticum aestivum*), 121
bristly foxtail grass (156. *Setaria barbata*), 106
broom millet (163. *Sorghum bicolor*), 110
broomstick grass (16. *Aristida adscensionis*), 33
browntop millet (193. *Urochloa ramosa*), 125
buchu grass (51. *Cymbopogon caesius*), 51
buffalo grass (54. *Dactyloctenium aegyptium*), 53
bug's egg grass (98. *Eragrostis tenella*), 75
burgrass (32. *Cenchrus biflorus*), 41
burgrass (178. *Tragus berteronianus*), 118
burgugrass (78. *Echinochloa stagnina*), 65
burr (160. *Setaria verticillata*), 108
burr bristle grass (160. *Setaria verticillata*), 108
bushveld dropseed (166. *Sporobolus ioclados*), 111
bushy bluestem grass (12. *Andropogon perligulatus*), 31

California grass (191. *Urochloa mutica*), 125
camel grass (52. *Cymbopogon schoenanthus*), 52
Cameroon grass (162. *Sorghum arundinaceum*), 110
Carib grass (191. *Urochloa mutica*), 125
carrot-seed grass (178. *Tragus berteronianus*), 118
cat's tail dropseed (169. *Sporobolus pyramidalis*), 113
cat's tail grass (15. *Anthephora pubescens*), 32
cattail millet (31. *Cenchrus americanus*), 41
cogon grass (109. *Imperata cylindrica*), 81
common bamboo (30. *Bambusa vulgaris*), 40
common wild sorghum (162. *Sorghum arundinaceum*), 110
corn (199. *Zea mays*), 128
corn bead (47. *Coix lacryma-jobi*), 49
corn grass (156. *Setaria barbata*), 106
couch panicum (134. *Panicum repens*), 94
crimson false bluestem (153. *Schizachyrium sanguineum*), 105

Delhi grass (55. *Dichanthium annulatum*), 54
desert grass (136. *Panicum turgidum*), 95

Dominican lovegrass (96. *Eragrostis prolifera*), 74
Dutch grass (191. *Urochloa mutica*), 125
dwarf grass (123. *Oropetium capense*), 88

Egyptian grass (54. *Dactyloctenium aegyptium*), 53
Egyptian panic grass (157. *Setaria geminata*), 107
erapo grass (115. *Loudetia phragmitoides*), 85

false couch finger grass (69. *Digitaria longiflora*), 60
false signal grass (188. *Urochloa deflexa*), 123
feather finger grass (42. *Chloris virgata*), 46
feather lovegrass (98. *Eragrostis tenella*), 75
finger comb grass (54. *Dactyloctenium aegyptium*), 53
finger grass (62. *Digitaria debilis*), 57
floating grass (198. *Vossia cuspidata*), 128
foldedleaf grass (57. *Diectomis fastigiata*), 54
fonio of the birds (133. *Panicum laetum*), 94
fox brush (20. *Aristida hordeacea*), 34
foxtail grass (160. *Setaria verticillata*), 108

giant panic grass (130. *Panicum antidotale*), 92
giant rats grass (169. *Sporobolus pyramidalis*), 113
giant trident grass (184. *Tristachya superba*), 121
gingergrass (52. *Cymbopogon schoenanthus*), 52
goat's beard (40. *Chloris pilosa*), 45
gonya grass (195. *Urochloa trichopus*), 126
goosegrass (1. *Acrachne racemosa*), 25
gophertail lovegrass (90. *Eragrostis ciliaris*), 71
gray lovegrass (89. *Eragrostis cilianensis*), 70
Guinea millet (188. *Urochloa deflexa*), 123

hairy crab grass (70. *Digitaria nuda*), 61
hairy signal grass (196. *Urochloa villosa*), 127
hairy trident grass (184. *Tristachya superba*), 121
hare's grass (164. *Sporobolus festivus*), 111
hare's maze (103. *Hackelochloa granularis*), 78
hippo grass (78. *Echinochloa stagnina*), 65
hippo grass (198. *Vossia cuspidata*), 128
Holy Venda bamboo (128. *Oxytenanthera abyssinica*), 91
hook grass (113. *Leptothrium senegalense*), 84
horse grass (14. *Andropogon tectorum*), 32
hungry millet (65. *Digitaria exilis*), 58
Hunyani grass (39. *Chloris gayana*), 45

inchi grass (51. *Cymbopogon caesius*), 51
India sandbur (32. *Cenchrus biflorus*), 41
Indian crab grass (69. *Digitaria longiflora*), 60
Indian crown grass (139. *Paspalum scrobiculatum*), 97
Indian goosegrass (80. *Eleusine indica*), 66
Indian lovegrass (94. *Eragrostis pilosa*), 73
Indian paspalum (139. *Paspalum scrobiculatum*), 97

Jaieo millet (2. *Acroceras amplectens*), 25
Japanese lovegrass (92. *Eragrostis japonica*), 72
jaragua grass (106. *Hyparrhenia rufa*), 80
Job's tears (47. *Coix lacryma-jobi*), 49
Joe Tanner's grass (187. *Urochloa arrecta*), 122
jungle rice grass (76. *Echinochloa colona*), 63

kachi grass (51. *Cymbopogon caesius*), 51
Kalahari water grass (76. *Echinochloa colona*), 63
kangaroo grass (177. *Themeda triandra*), 117
khev grass (165. *Sporobolus helvolus*), 111
kodo millet (139. *Paspalum scrobiculatum*), 97

lalang grass (109. *Imperata cylindrica*), 81
large-seeded three-awn (24. *Aristida rhiniochloa*), 37
lemon grass (52. *Cymbopogon schoenanthus*), 52
Limpopo grass (77. *Echinochloa pyramidalis*), 64
lizard-tail grass (103. *Hackelochloa granularis*), 78

maize (199. *Zea mays*), 128
Mandinka rice (124. *Oryza barthii*), 89
marvet (156. *Setaria barbata*), 106
mock bluestem (102. *Euclasta condylotricha*), 78

naked crab grass (70. *Digitaria nuda*), 61
needle Indiangrass (161. *Sorghastrum stipoides*), 109

oats (29. *Avena sativa* L. subsp. *sativa*), 40

paddle grass (110. *Ischaemum polystachyum*), 82
paddy (127. *Oryza sativa*), 90
pan dropseed (166. *Sporobolus ioclados*), 111
pearl barley (47. *Coix lacryma-jobi*), 49
pearl millet (31. *Cenchrus americanus*), 41
pond lovegrass (92. *Eragrostis japonica*), 72
pricklegrass (178. *Tragus berteronianus*), 118

rat's tail (170. *Sporobolus spicatus*), 114
red autumn grass (153. *Schizachyrium sanguineum*), 105
red dropseed (164. *Sporobolus festivus*), 111
red grass (148. *Schizachyrium exile*), 102
red grass (177. *Themeda triandra*), 117
red rice (126. *Oryza longistaminata*), 90
red swamp grass (104. *Hemarthria altissima*), 79
reed grass (28. *Arundinella nepalensis*), 39
Rhodes grass (39. *Chloris gayana*), 45
Rhodesian blue grass (10. *Andropogon gayanus*), 30
ribbon grass (121. *Oplismenus hirtellus*), 87
rice grass (112. *Leersia hexandra*), 83
river grass (28. *Arundinella nepalensis*), 39
rough bristle grass (160. *Setaria verticillata*), 108
rough lovegrass (86. *Eragrostis aspera*), 69
roundseed urochloa (195. *Urochloa trichopus*), 126
russet grass (116. *Loudetia simplex*), 85

Sahara millet (136. *Panicum turgidum*), 95
salt grass (170. *Sporobolus spicatus*), 114
Santa Barbara grass (55. *Dichanthium annulatum*), 54
savanna bamboo (128. *Oxytenanthera abyssinica*), 91
Scotch grass (53. *Cynodon dactylon*), 52
sewan grass (111. *Lasiurus scindicus*), 82
silver tip wheat (185. *Triticum aestivum*), 121
slender meadow grass (94. *Eragrostis pilosa*), 73
slim-flower lovegrass (91. *Eragrostis gangetica*), 71
small-flowered panic grass (181. *Trichanthecium parvifolium*), 119
snake grass (104. *Hemarthria altissima*), 79
southern cut grass (112. *Leersia hexandra*), 83
spike grass (83. *Elytrophorus spicatus*), 68
stalked bristle grass (179. *Tragus racemosus*), 118
stalked burgrass (179. *Tragus racemosus*), 118
stink grass (89. *Eragrostis cilianensis*), 70
striped bamboo (30. *Bambusa vulgaris*), 40
Sudan grass (163. *Sorghum bicolor*), 110
summer grass (61. *Digitaria ciliaris*), 56
sweet sorghum (163. *Sorghum bicolor*), 110
sweetheart grass (179. *Tragus racemosus*), 118

tambuki grass (10. *Andropogon gayanus*), 30
Tanner grass (187. *Urochloa arrecta*), 122
Thalia lovegrass (87. *Eragrostis atrovirens*), 70
thatchgrass (4. *Anadelphia afzeliana*), 26
thatchgrass (5. *Anadelphia leptocoma*), 27
thatching grass (106. *Hyparrhenia rufa*), 80
torpedo grass (134. *Panicum repens*), 94
tropical cup grass (101. *Eriochloa fatmensis*), 77
Tunis grass (162. *Sorghum arundinaceum*), 110

Victoria grass (134. *Panicum repens*), 94
volunteer wheat (185. *Triticum aestivum*), 121

white acha (65. *Digitaria exilis*), 58
white grass (22. *Aristida mutabilis*), 36
white grass (42. *Chloris virgata*), 46
white grass (112. *Leersia hexandra*), 83
whorled dropseed (169. *Sporobolus pyramidalis*), 113
wild African finger millet (79. *Eleusine africana*), 65
wild crab grass (61. *Digitaria ciliaris*), 56

wild findi (70. *Digitaria nuda*), 61
wild fonio (133. *Panicum laetum*), 94
wild hungry rice (133. *Panicum laetum*), 94
wild paspalum (139. *Paspalum scrobiculatum*), 97
wild rice (124. *Oryza barthii*), 89
windmill grass (42. *Chloris virgata*), 46
wine bamboo (128. *Oxytenanthera abyssinica*), 91
woods grass (121. *Oplismenus hirtellus*), 87
wool grass (15. *Anthephora pubescens*), 32
woolly lovegrass (90. *Eragrostis ciliaris*), 71
yardgrass (80. *Eleusine indica*), 66
yellow foxtail (158. *Setaria pumila*), 107
yellow hard grass (108. *Hyperthelia dissoluta*), 80
yellow thatching grass (108. *Hyperthelia dissoluta*), 80

Index of Scientific Names

Names without a caret (^) are accepted; those with a caret are synonyms. Page numbers in ***bold italics*** denote account description.

Acrachne racemosa, 15, ***25***
Acroceras amplectens, 16, ***25***, 26
Alloteropsis paniculata, 15, ***26***
Anadelphia afzeliana, 20, ***26***, 27
  leptocoma, 23, ***27***
Andropogon africanus, 16, ***28***
  canaliculatus, 19, ***28***
  chevalieri, 15, ***29***
  fastigiatus^, 54
  festuciformis, 22, ***29***, 30
  gayanus, 16, ***30***
  ivorensis, 20, ***30***, 31
  perligulatus, 15, ***31***
  pseudapricus, 15, ***31***, 32
  tectorum, 16, ***32***
Anthephora pubescens, 15, ***32***, 33
Aristida adscensionis, 19, 22, ***33***
  cumingiana var. *uniseta*, 20, 23, ***33***, 34
  diminuta, 20, 21, ***33***, 34
  funiculata, 17, ***34***, 35
  hordeacea, 18, 20, 22, ***34***, 35
  kunthiana, 19, ***35***, 36
  mutabilis, 16 ***36***
  recta, 17, ***36***, 37
  rhiniochloa, 18, ***37***
  sieberiana, 14, ***37***, 38
  stipoides, 19, ***38***
Arthraxon lancifolius, 14, ***38***, 39
Arundinella nepalensis, 16, ***39***, 40
Avena sativa, 19, ***40***

Bambusa abyssinica^, 91
  vulgaris, 14, ***40***, 41
Brachiaria arrecta^, 122
  deflexa^, 123
  jubata^, 123
  lata^, 124
  mutica^, 125
  orthostachys^, 125
  ramosa^, 125
  stigmatisata^, 126
  villosa^, 127
  xantholeuca^, 127
Brachyachne obtusiflora^, 86

Cenchrus americanus, 19, ***41***
  biflorus, 7, 16, 19, ***41***, 42
  ciliaris, 17, ***42***
  hordeoides, 23, ***42***, 43
  pedicellatus, 23, ***42***, 43
  polystachios subsp. *atrichus*, 23, ***43***, 44
  prieurii, 21, ***44***,
  spicatus^, 41
  violaceus, 21, 22, ***44***, 45
Chloris gayana, 15, ***45***
  lamproparia^, 115
  pilosa, 19, 20, 22, ***45***, 46
  prieurii, 22, ***46***
  virgata, 18, ***46***, 47
Chrysochloa hindsii, 15, ***47***
Chrysopogon fulvibarbis, 18, ***47***, 48
  nigritanus, 18, ***48***
Coelachyrum brevifolium, 22, ***48***, 49
Coelorachis afraurita^, 99
Coix lacryma-jobi, 16, ***49***, 136
Ctenium elegans, 20, ***49***, 50
  newtonii, 17, ***50***
  villosum, 20, ***50***, 51
Cymbopogon caesius, 14, 16, 20, 21, ***51***
  giganteus^, 51
  schoenanthus, 20, ***51***, 52
Cynodon dactylon, 14, ***52***, 53

Dactyloctenium aegyptium, 14, ***53***
Dichanthium annulatum, 15, 18, ***53***, 54
  condylotrichum^, 78
  foveolatum, 17, ***54***
Diectomis fastigiata, 16, ***54***, 55

Digitaria acuminatissima, 19, ***55***
argillacea^, 59
aristulata, 15, ***55***, 56
barbinodis, 18, ***56***
ciliaris, 22, ***56***, 57
debilis, 21, ***57***
delicata, 15, ***57***, 58
delicatula, 18, ***58***
exilis, 22, ***58***, 59
fragilis, 18, ***59***
gayana, 22, ***59***, 60
leptorachis, 17, ***60***
longiflora, 14, ***60***, 61
nuda, 15, ***61***
ternata, 22, ***61***, 62
Dibeteropogon hagerupii, 16, ***61***, 62
Dilophotriche tristachyoides, 21, ***62***
Dinebra coerulescens, 19, ***62***, 63

Echinochloa callopus, 21, ***63***
colona, 20, ***63***, 64
pyramidalis, 14, ***64***, 65
stagnina, 18, ***65***
Eleusine africana, 18, ***65***, 66
indica, 16, 21, ***66***, 67
Elionurus elegans, 18, ***67***
Elymandra androphila, 19, 20, ***67***, 68
Elytrophorus spicatus, 22, ***68***
Enneapogon persicus, 17, ***68***, 69
Enteropogon prieurii^, 46
Eragrostis aegyptiaca, 19, ***69***
amabilis^, 75
aspera, 20, ***69***, 70
atrovirens, 19, 20, ***70***
barteri, 14, ***70***, 71
cilianensis, 19, ***70***, 71
ciliaris, 19, ***71*** ,72
gangetica, 19, ***71***, 72
japonica, 21, ***72***, 73
lingulata, 23, ***72***, 73
pilosa, 19, ***73***, 74
plurigluma, 22, ***73***, 74
prolifera, 20, ***74***, 75
squamata, 22, ***74***, 75
tenella, 19, ***75***, 76
tremula, 20, ***75***, 76
turgida, 22, ***76***, 77
Eriochloa fatmensis, 21, ***77***
Euclasta condylotricha, 19, ***78***

Hackelochloa granularis, 15, ***78***, 79
Hemarthria altissima, 15, ***79***
Hyparrhenia cyanescens, 14, 16, ***79***, 80
rufa, 17, ***80***
subplumosa, 19, ***80***, 81
Hyperthelia dissoluta, 15, 21, ***80***, 81

Imperata cylindrica, 17, ***81***, 82
Ischaemum polystachyum, 17, ***82***

Lasiurus scindicus, 17, ***82***, 83
Leersia hexandra, 17, ***83***, 84
Leptochloa coerulescens^, 62
Leptothrium senegalense, 17, ***84***
Loudetia hordeiformis, 18, ***84***, 85
phragmitoides, 14, ***85***
simplex, 16, 18, 22, ***85***, 86
togoensis, 21, ***86***
Loudetiopsis kerstingii, 18, ***86***, 87

Micrachne obtusiflora, 20, ***86***, 87
Microchloa indica, 16, 17, ***87***, 88
Mnesithea afrautita^, 99
granularis^, 78

Oplismenus hirtellus, 18, ***87***, 88
Oropetium aristatum, 14, ***88***, 89
capense, 16, ***88***, 89
Oryza barthii, 14, ***89***, 90
brachyantha, 14, ***89***, 90
longistaminata, 14, ***90***, 91
sativa, 14, ***90***, 91
Oxytenanthera abyssinica, 14, ***91***, 92

Panicum anabaptistum, 17, ***92***
antidotale, 17, ***92***, 93
aphanoneurum^, 93
brazzavillense^, 119
callosum, 15, 22, ***93***
fluviicola, 17, 22, ***93***, 94
humile^, 96
laetum, 22, ***94***
nigerense^, 93
orthostachys^, 125
parvifolium^, 119
repens, 15, 17, ***94***, 95
stigmatisatum^, 126
subalbidum^, 92
tenellum, 20, ***95***
turgidum, 14, ***95***, 96
violaceum^, 42
walense, 16, ***96***
Parahyparrhenia annua, 14, ***96***, 97
Paspalidium geminatum^, 107
Paspalum scrobiculatum, 14, ***97***, 98
Pennisetum ciliare^, 42
glaucum^, 41
hordeoides^, 42
pedicellatum^, 42
polystachion subsp. *atrichum*^, 43
violaceum^, 44
Phragmites karka, 14, ***98***
vallatorius^, 98
Poa amabilis^, 75

Rhytachne rottboellioides, 20, ***98***, 99
triaristata, 20, ***99***
Rottboellia afraurita, 22, ***99***, 100

Sacciolepis africana, 18, ***99***, 100
chevalieri, 17, 22, ***99***, 100
micrococca, 16, 20, ***100***, 101
Schizachyrium brevifolium, 16, ***101***, 102
exile, 21, ***102***
gresicola, 21, ***103***
nodulosum, 22, ***103***, 104
ruderale, 16, ***104***
rupestre, 23, ***104***, 105
sanguineum, 16, ***105***
Schoenefeldia gracilis, ***105***
Sehima ischaemoides, 16, ***106***
Setaria barbata, 16, 18, ***106***, 107
geminata, 14, ***107***
pumila, 22, ***107***, 108
sphacelata var. *anceps*, 18, ***107***, 108
sphaceleta var. *serícea*^, 107
verticillata, 22, ***108***, 109
Sorghastrum stipoides, 18, ***109***
Sorghum arundinaceum, 23, ***110***
bicolor, 19, ***110***, 111
Sporobolus festivus, 20, 21, ***111***
helvolus, 17, ***111***, 112
ioclados, 15, ***111***, 112
microprotus, 21, ***112***, 113
pectinellus, 20, 21, ***112***, 113
pyramidalis, 18, ***113***, 114
spicatus, 14, ***114***
stolzii, 21, ***114***, 115
Stapfochloa lamproparia, 19, ***115***
Stipagrostis acutiflora, 15, 19, ***115***, 116
hirtigluma, 21, ***116***
uniplumis, 20, ***116***, 117

Tetrapogon cenchriformis, 16, ***117***
Themeda triandra, 18, 23, ***117***, 118
Tragus berteronianus, 21, ***118***
racemosus, 21, ***118***, 119
Trichanthecium brazzavillense, 22, ***119***
parvifolium, 17, 18, ***119***, 120
Trichoneura mollis, 22, ***120***
Tripogon minimus^, 120
Tripogonella minima, 17, ***120***, 121
Tristachya superba, 17, ***121***
Triticum aestivum, 14, ***121***, 122

Urelytrum muricatum, 19, ***122***
Urochloa arrecta, 18, ***122***, 123
deflexa, 21, ***123***
jubata, 21, ***123***, 124
lata, 15, ***124***
mutica, 15, 18, ***124***, 125
orthostachys, 18, ***125***
ramosa, 21, ***125***, 126
stigmatisata, 15, ***126***
trichopus, 16, 18, ***126***, 127
villosa, 15, ***127***
xantholeuca, 21, ***127***, 128

Vossia cuspidata, 14, ***128***

Zea mays, 21, ***128***, 129

SUMMARY OF REQUIREMENTS FOR SMITHSONIAN CONTRIBUTIONS SERIES

For comprehensive guidelines and specifications, visit https://scholarlypress.si.edu.

ABSTRACTS must not exceed 300 words.

TEXT must be prepared in a recent version of Microsoft Word; use a Times font in 12 point for regular text; be double-spaced; and have 1″ margins.

REQUIRED ELEMENTS are title page, abstract, table of contents, main text, and references.

FIGURES must be numbered sequentially (1, 2, 3, etc.) in the order called out; have components lettered consistently (in size, font, and style) and described in captions; include a scale bar or scale description, if appropriate; include any legends in or on figures rather than in captions. Figures must be original and must be submitted as individual TIF or EPS files.

FIGURE FILES must meet all required specifications in the Digital Art Preparation Guide. Color images should be requested only if required.

TAXONOMIC KEYS in natural history manuscripts should use the aligned-couplet form for zoology. If cross-referencing is required between key and text, do not include page references within the key, but number the keyed-out taxa, using the same numbers with their corresponding heads in the text.

SYNONYMY IN ZOOLOGY must use the short form (taxon, author, year:page), with full reference at the end of the manuscript under "References."

REFERENCES should be in alphabetical order, and in chronological order for same-author entries. Each reference should be cited at least once in main text. Complete bibliographic information must be included in all citations. Examples of the most common types of citations can be found at SISP's website under Resources/Guidelines & Forms.

View publication stats