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Grasses of Washington, D.C.

Kamal M. Ibrahim
and
Paul M. Peterson

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ABSTRACT

Ibrahim, Kamal M., and Paul M. Peterson. Grasses of Washington, D.C. *Smithsonian Contributions to Botany*, number 99, viii + 128 pages, 190 figures, 2014.—A vegetative key, descriptions, and illustrations for the identification of 182 native and naturalized grasses that occur in Washington, D.C., are presented. In addition, we provide a glossary of terms and indexes to scientific and common names. The key is based on vegetative characters to allow identification of specimens that primarily do not have flowering structures (inflorescences and spikelets).

Cover images, from left to right: *Cinna arundinacea* panicle (Figure 47, detail); *Andropogon glomeratus* inflorescence (Figure 18, detail); *Pleioblastus argenteostriatus* fo. *glaber* habit, herbarium specimen (from Figure 157); *Setaria faberi* panicle (Figure 169, detail); *Tridens flavus* var. *flavus* panicle (Figure 186, detail).

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

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Library of Congress Cataloging-in-Publication Data
Ibrahim, Kamal (Kamal M.)
Grasses of Washington, D.C. / Kamal M. Ibrahim and Paul M. Peterson.
p. cm. — (Smithsonian contributions to botany ; no. 99)
1. Grasses—Washington (D.C.)—Identification. I. Peterson, Paul M. II. Title. III. Series: Smithsonian contributions to botany ; no. 99.
QK495.G74I25 2014
584'.909753—dc23
2013044771

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

♾ 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.

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Grasses of Washington, D.C.

INTRODUCTION

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 easily 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.

This publication presents a vegetative key, descriptions, illustrations, and glossary for the identification of 182 native and naturalized grasses that occur in Washington, D.C. Our list of species is primarily based on Shetler and Orli (2002), and we have consulted Hitchcock (1951), Brown and Brown (1984), Gleason and Cronquist (1991), Barkworth et al. (2003, 2007), Steury (2004), Clayton et al. (2006), Terrell and Peterson (2009), Weakley et al. (2012), Tropicos (2013), Soreng et al. (2013), and Steury et al. (2013). We follow the accepted names in the Catalogue of New World Grasses and a worldwide generic classification based principally on molecular DNA sequence studies (Soreng et al., 2013). Very few floristic characteristics were used to construct the key for identification. Diagrammatic illustrations, not made to scale but drawn to emphasize the structural characteristics, are presented for each species. A description of each species is presented in alphabetical order, and indexes to the scientific and common names and a glossary are included.

Morphological Characters

The common grass habit for most species is an upright, cylindrical, rarely compressed culm (stem) anchored in the soil by adventitious roots. The culm consists of nodes and internodes with leaves distichously arising from the nodes. The inflorescence usually comprises numerous spikelets that are composed of one or more florets that

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Manuscript received 26 March 2013; accepted 22 August 2013.

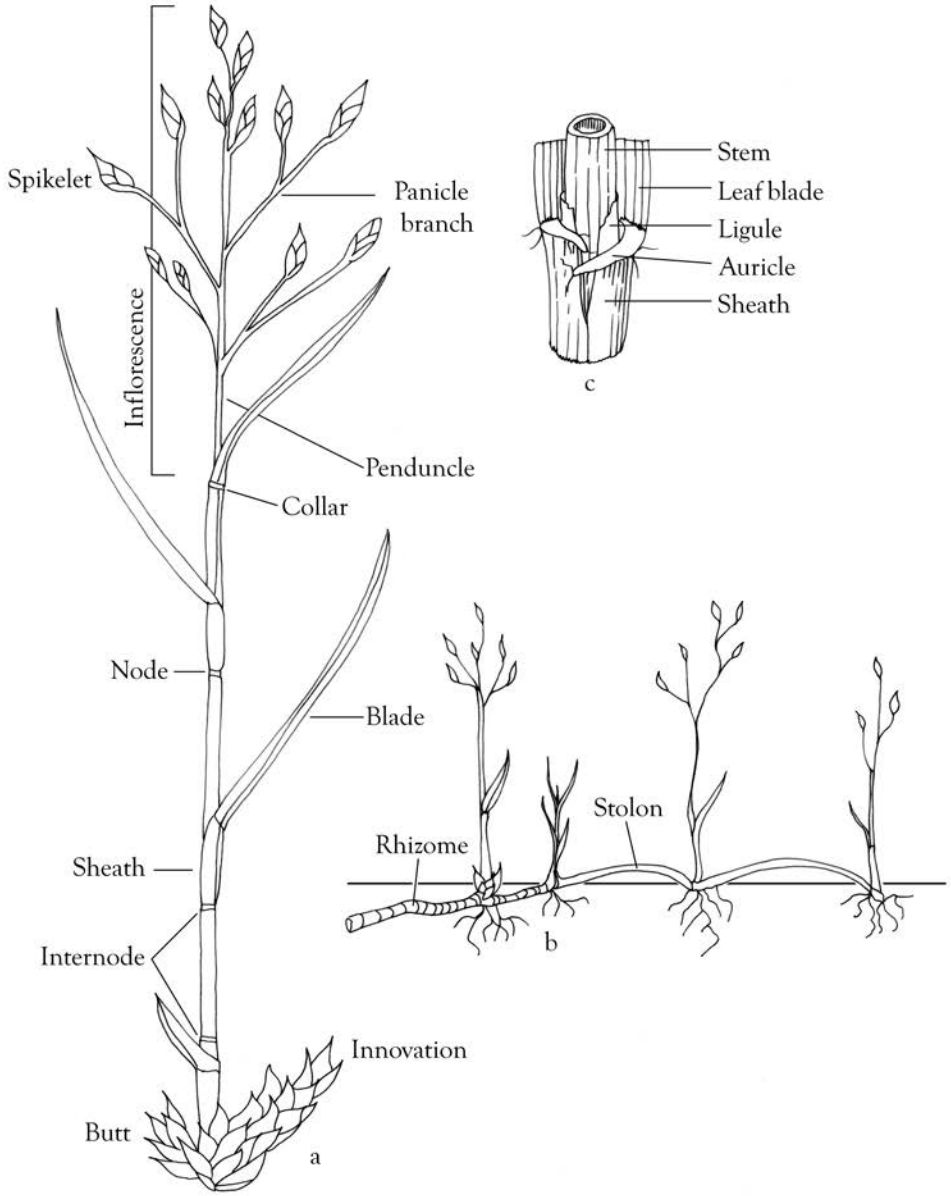

FIGURE 1. General morphology. a. Culm. b. Rhizome and stolon. c. Sheath, ligule, and blade.

contain the flower parts (pistil and stamens). The general morphology of a grass is illustrated in detail in Figures 1–8.

Roots. The luxuriant fibrous root system anchors the growing plant and is comprised of 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 the nodes.

Culms. The grass stem is known as a culm (Figure 1). It is made up of a series of internodes and nodes. The internodes at the base of a culm are very short, and in the upper portion of a culm they extend to a considerable length. Internodes are usually hollow but sometimes are solid, as in *Saccharum*,

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

or filled with white pith, as in *Sorghum*. The plant height varies considerably because of 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 other 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, sometimes split with overlapping margins or 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

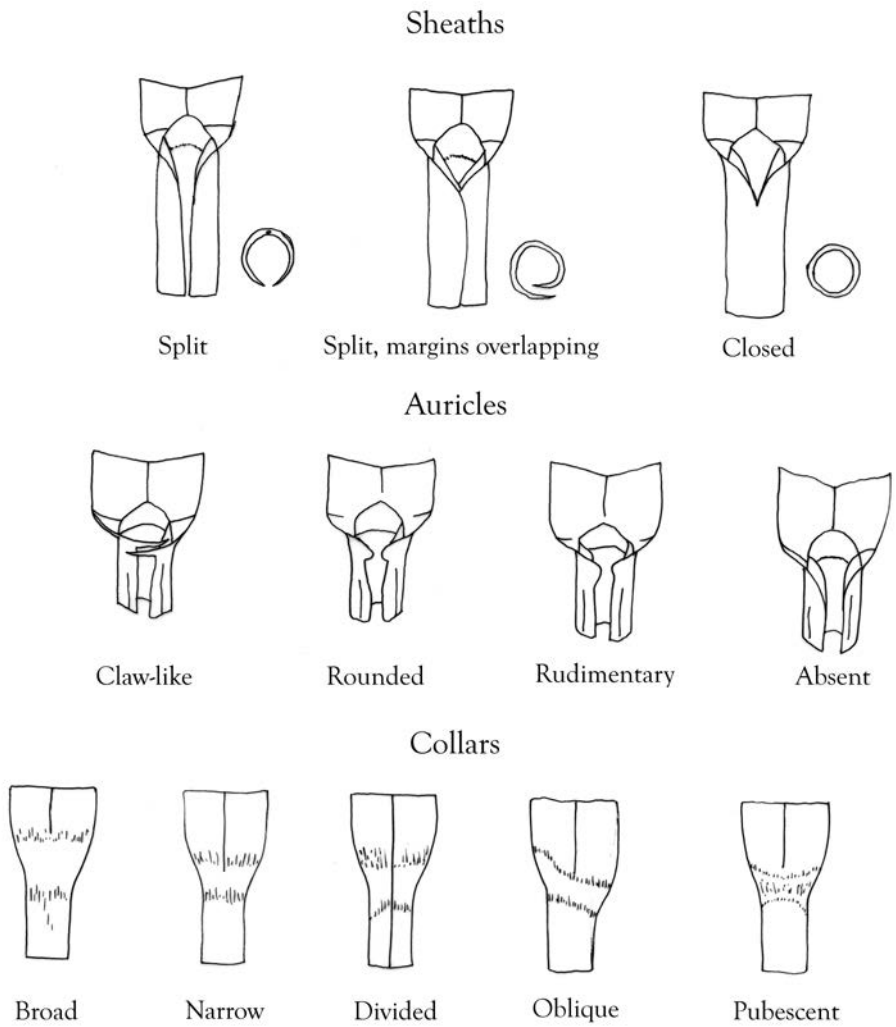

FIGURE 3. Types of sheaths, auricles, and collars.

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 are often tinged with pink or purple at the base. They are also 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). The base of culms sometimes have many butt sheaths, or the old remnant portions of the leaves.

Auricles. Auricles are appendages that project from each side of the collar that marks the divisions between the sheath and blade. Auricles may be horizontally clawed, rudimentary, and fully or slightly rounded. Most species do not possess auricles (Figure 3).

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 also 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.

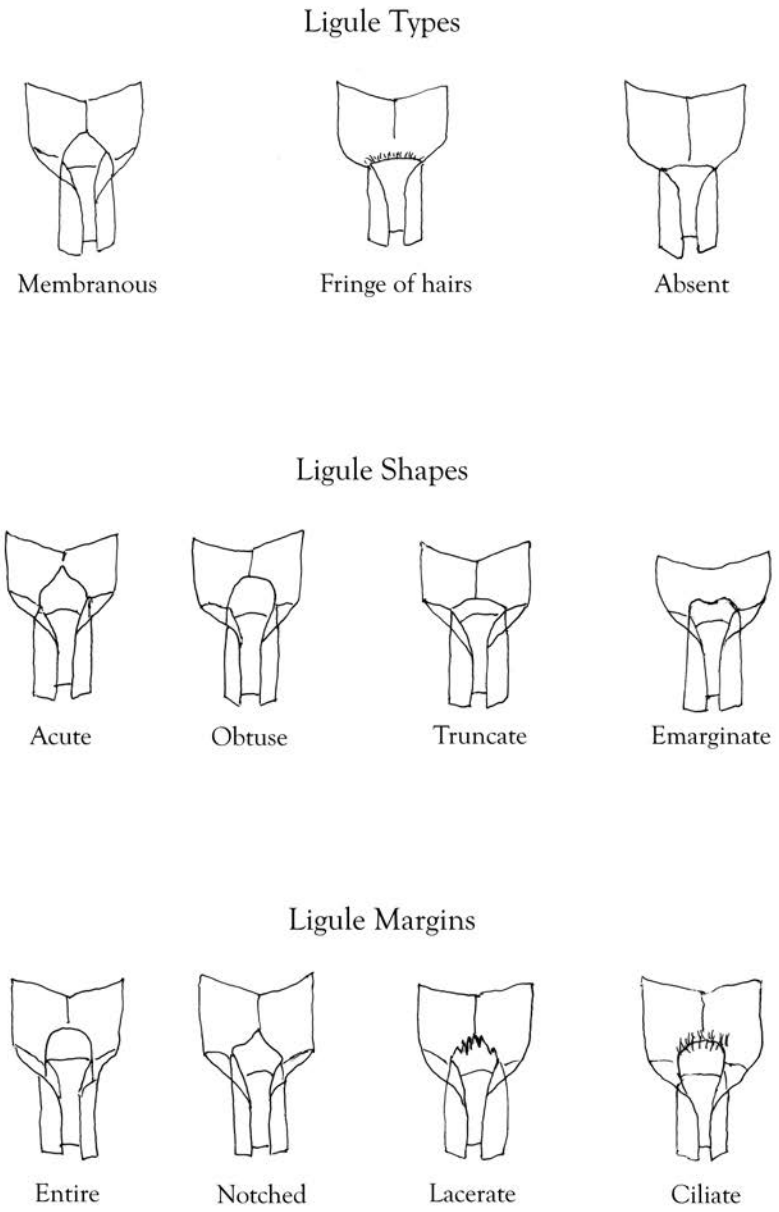

FIGURE 4. Ligule types, shapes, and margins.

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 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 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.

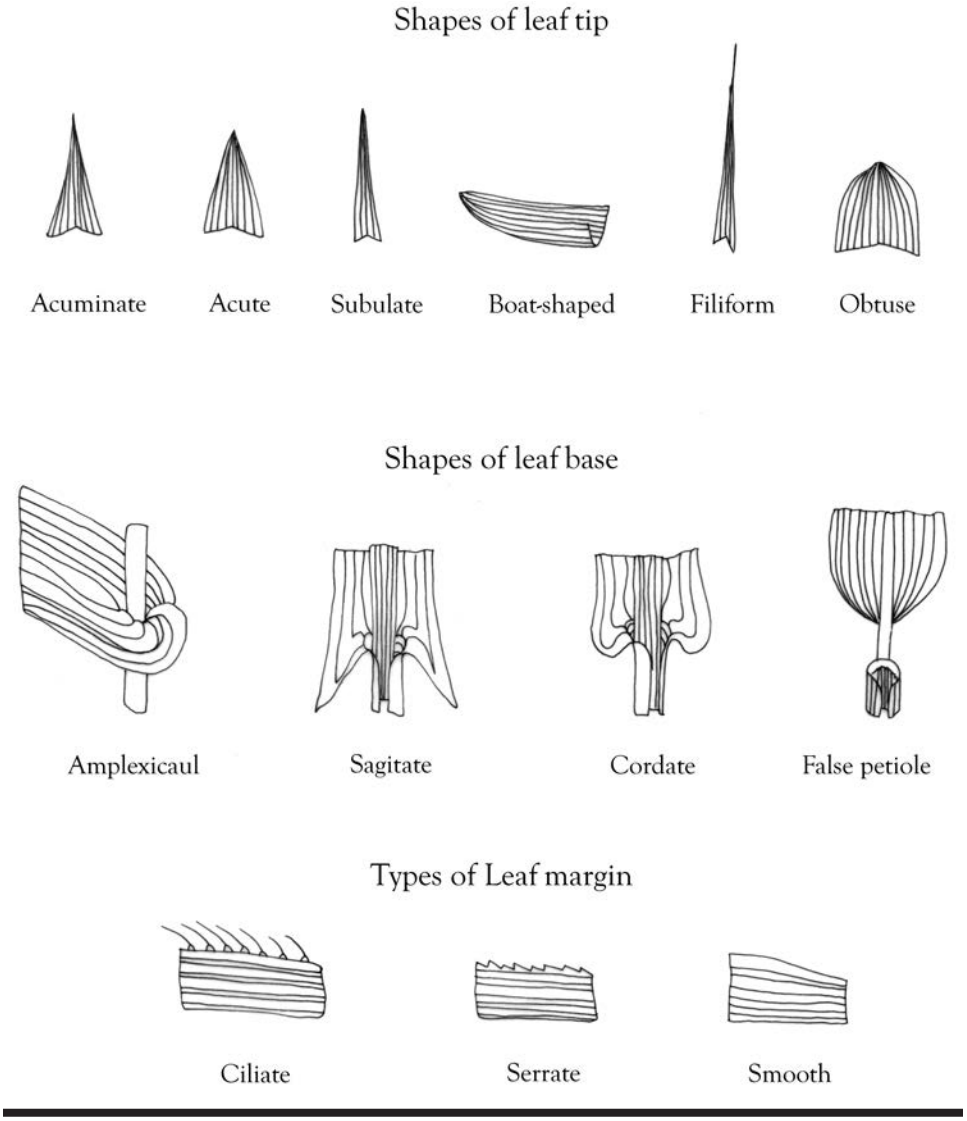

FIGURE 5. Leaf blade apices, bases, and margins.

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 (Figure 7) the spikelets are attached directly to the unbranched main axis without pedicels. The inflorescence may be an individual terminal spike as in *Elymus* and *Lolium* or several spikes attached to the main axis in different patterns (these are panicles), in pairs as in *Paspalum*, racemosely attached as in *Leptochloa,* or digitately attached as in *Cynodon*.

Racemes. A raceme is an unbranched inflorescence with each spikelet borne on a single pedicel directly on the axis (Figure 7). This type of inflorescence is rare in the grasses, but there are many species where more than one raceme is found in the inflorescence, which is then technically referred to as a panicle.

Panicles. A panicle is an inflorescence in which the main axis has several lateral, whorled or individual indeterminate branches, each branch terminating in a pedicellate spikelet (Figures 7, 8). A true panicle does not have any leaf sheaths within the inflorescence. A rame is a compound inflorescence in the tribe Andropogoneae consisting of one to many units (branches) of one sessile and one or two pedicellate spikelets. This arrangement is typical of the Andropogonodae, and in many of the older, published flora, it was referred to as "racemes."

Spikelets. Spikelets are the primary inflorescence unit (Figure 8), usually consisting of a short axis (rachilla) bearing two basal glumes and one or more distal florets. Each floret usually consists of a lower lemma and upper palea.

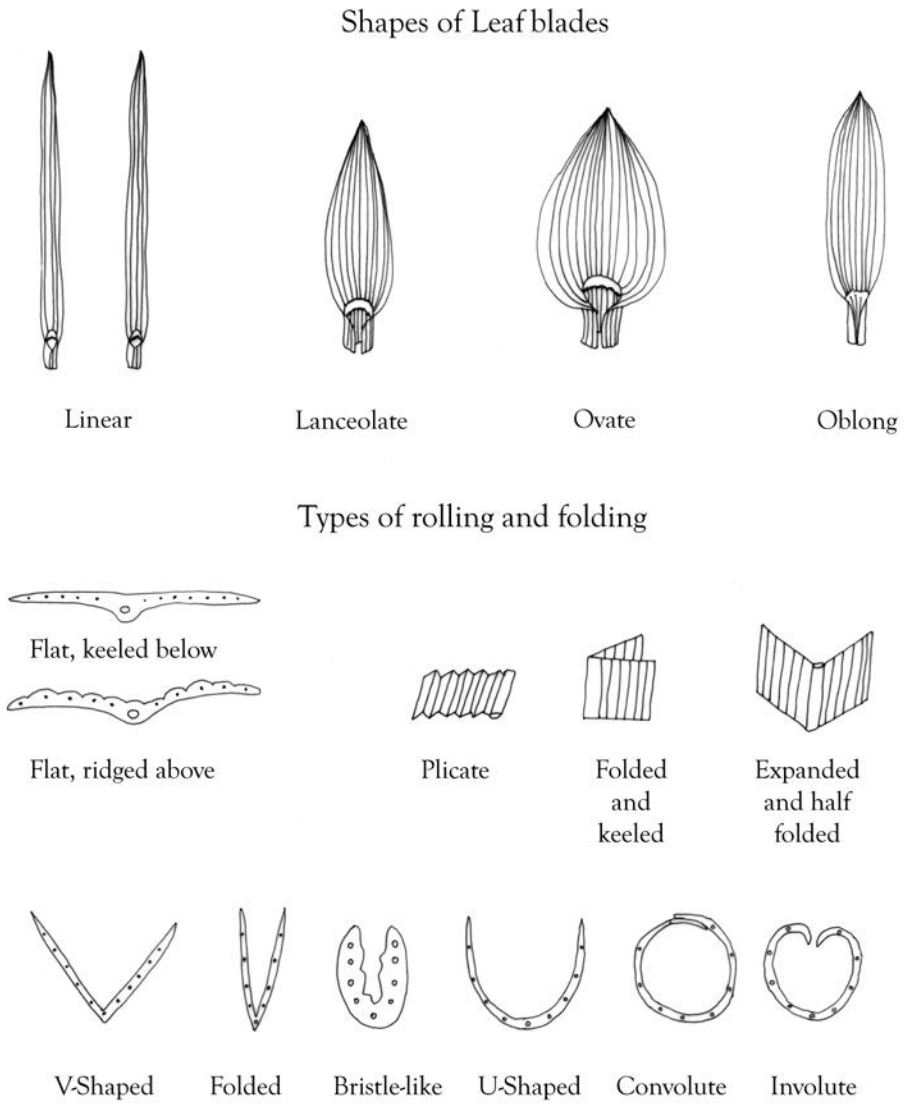

FIGURE 6. Leaf blade characteristics.

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. 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 common name(s); 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 Hitchcock (1951) and Barkworth et al. (2003, 2007). Care should be taken not to confuse grasses with "grasslike" species that occur under natural conditions and can be confused with true grasses. These belong chiefly to the sedge family (*Cyperaceae*) and the rush family (*Juncaceae*). Since this publication deals only with grasses, it is necessary to differentiate between true grasses and other grasslike species. In grasses, leaves are two-ranked and arise at solid conspicuous nodes along hollow stems (culms), which are circular in cross section. A leaf is comprised of a blade and a sheath surrounding the culm and is 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

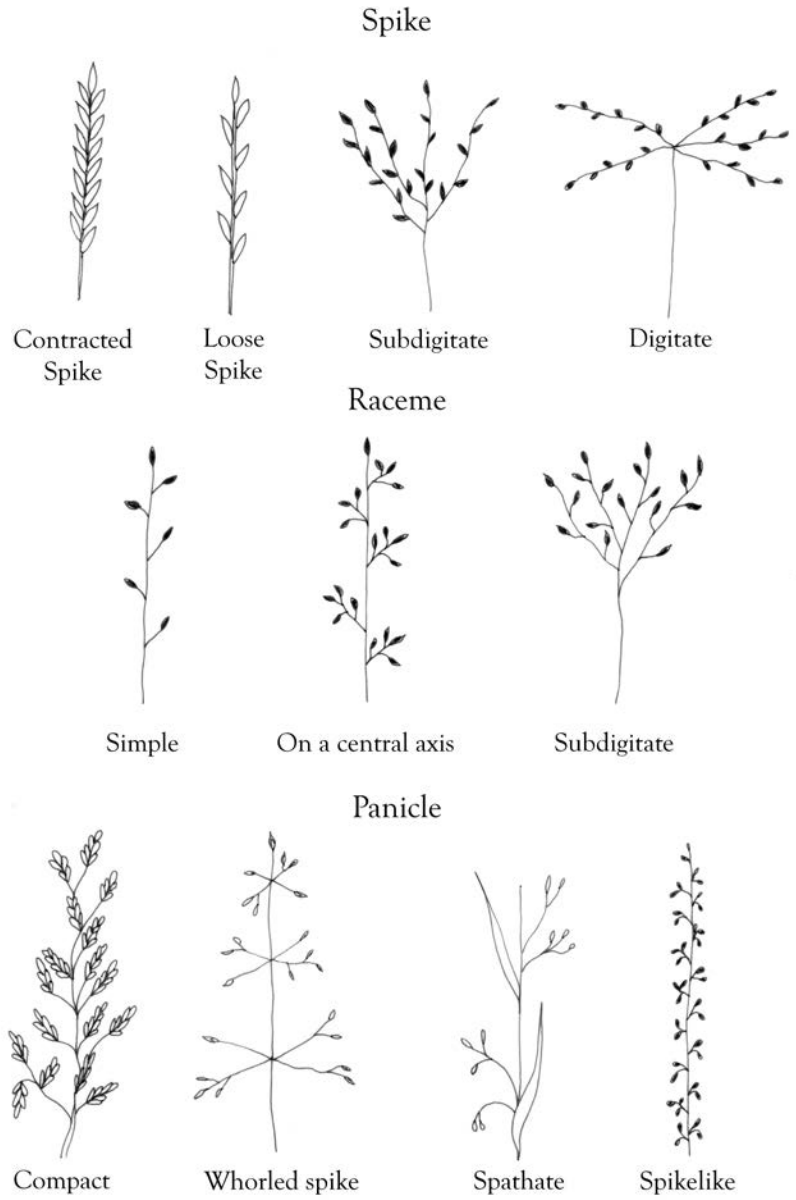

FIGURE 7. Inflorescence types.

triangular in cross section. The base of the leaf usually forms a closed sheath around the stem, and there is no ligule. However, sometimes there is a projection at the top of the sheath, opposite of 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. Since we are dealing with 182 grasses in Washington, D.C., 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 keys to each group. Although many readers are familiar with the use of a dichotomous key, a note on how to use the vegetative key 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 where a species name appears at

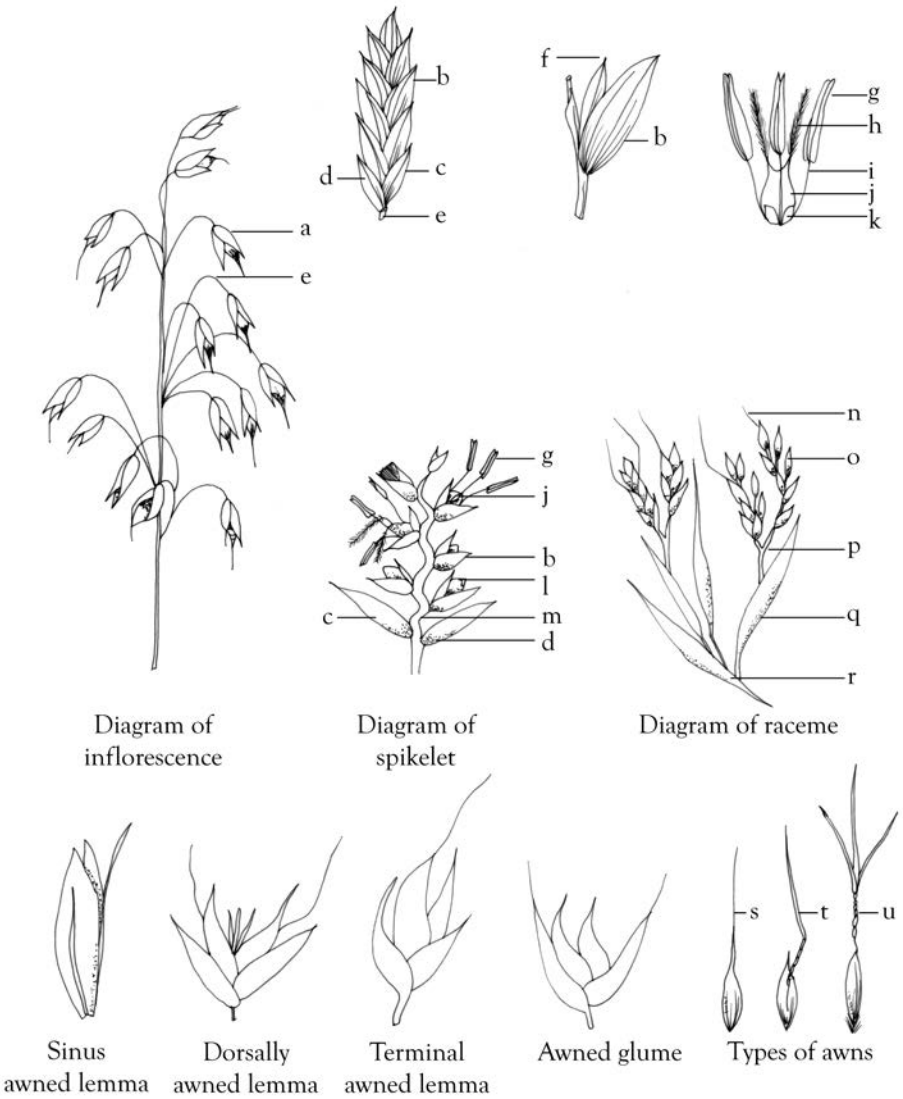

FIGURE 8. Inflorescence and spikelet characteristics. Labels indicate the following: a, spikelet; b, lemma; c, upper glume; d, lower glume; e, pedicel; f, palea; g, anther; h, stigma; i, filament; j, ovary; k, lodicule; l, grain; m, rachilla; n, awn; o, raceme; p, peduncle; q, spatheole; r, spathe; s,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

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. Note also that for the purpose of this key and in the descriptions of species, "blade" refers only to mature laminas just above the collar.

Acknowledgements

We thank the United States National Herbarium (US), Department of Botany, National Museum of Natural History, Smithsonian Institution, for allowing the first author work space; Robert J. Soreng (US) for providing valuable information from the Catalogue of New World Grasses (Poaceae); and Deborah Bell (US) for assistance. In addition, we thank Kitt Repass for preparing the illustrations and revising a few initial drawings made by Heidi Nevin. We give special thanks to Karen Dillon for help with Photoshop, to Kate Nicolette for typing the text, and to Wesley Knapp and Chris Frye for many helpful comments aimed at improving the manuscript. Finally, we thank all the dedicated agrostologists, past and present, who collected extensive material and recorded their findings in books, manuals, floras, and published papers.

Vegetative Key to the Grasses of Washington, D.C.

1a. Bamboo-like or reedlike . . . . . Group 1
1b. Not bamboo-like or reedlike 2
2a. Plant habit mat forming . . . . . Group 2
2b. Plant habit not mat forming 3
3a. Internodes solid . . . . . Group 3
3b. Internodes not solid 4
4a. Auricles present . . . . . Group 4
4b. Auricles lacking 5
5a. Leaf blades filiform . . . . . Group 5
5b. Leaf blades not filiform 6
6a. Leaf blade apices attenuate . . . . . Group 6
6b. Leaf blade apices not attenuate 7
7a. Leaf sheaths keeled . . . . . Group 7
7b. Leaf sheaths not keeled 8
8a. Leaf blade bases cordate or broadly rounded . . . . . Group 8
8b. Leaf blade bases not cordate or broadly rounded 9
9a. Oral hairs present . . . . . Group 9
9b. Oral hairs lacking 10
10a. Leaf blades lanceolate . . . . . Group 10
10b. Leaf blades not lanceolate 11
11a. Lower nodes rooting . . . . . Group 11
11b. Lower nodes not rooting 12
12a. Culms branching . . . . . Group 12
12b. Culms not branching 13
13a. Rhizomes present . . . . . Group 13
13b. Rhizomes absent 14
14a. Ligules a fringe of hairs . . . . . Group 14
14b. Ligules not a fringe of hairs 15
15a. Internodes pubescent . . . . . Group 15
15b. Internodes not pubescent 16
16a. Ligules ciliate membranes . . . . . Group 16
16b. Ligules eciliate membranes 17
17a. Leaf blade margins pubescent . . . . . Group 17
17b. Leaf blade margins not pubescent 18

18a. Leaf sheaths closed or partially closed . . . . . Group 18
18b. Leaf sheaths open 19
19a. Plants annuals . . . . . Group 19
19b. Plants perennials . . . . . Group 20

GROUP 1. BAMBOO-LIKE OR REEDLIKE

1a. Plants 1–5 m, tall 2
1b. Plants usually less than 85 cm tall 3
2a. Rhizomes elongated; culms not spongy . . . . . (147) ***Phragmites australis* subsp. *australis***
2b. Rhizomes not elongated; culms spongy . . . . . (182) ***Zizania aquatica***
3a. Oral setae present . . . . . (149) ***Pleioblastus argenteostriatus* fo. *glaber***
3b. Oral setae lacking or at least poorly developed . . . . . (150) ***Pleioblastus pygmaeus***

GROUP 2. MAT FORMING

1a. Rhizomes present, elongated . . . . . (42) ***Cynodon dactylon***
1b. Rhizomes absent or, if present, short 2
2a. Leaf blades elliptic or oblong . . . . . (121) ***Microstegium vimineum***
2b. Leaf blades not elliptic or oblong 3
3a. Leaf blades lanceolate, bases broadly rounded . . . . . (57) ***Dichanthelium laxiflorum***
3b. Leaf blades linear, bases not broadly rounded 4
4a. Leaf blades bases amplexicaul . . . . . (21) ***Arthraxon hispidus***
4b. Leaf blades bases not amplexicaul 5
5a. Stolons present, culms unbranched . . . . . (90) ***Eragrostis hypnoides***
5b. Stolons absent, culms branched 6
6a. Rhizomes short . . . . . (139) ***Paspalum dissectum***
6b. Rhizome absent 7
7a. Blade margins spinulose . . . . . (75) ***Echinochloa muricata***
7b. Blade margins scabrous . . . . . (69) ***Digitaria ciliaris***

GROUP 3. INTERNODES SOLID

1a. Butt sheaths with white hairs; ligules a fringe of hairs . . . . . (180) ***Tripsacum dactyloides***
1b. Butt sheaths without white hairs; ligules ciliate membranes 2
2a. Nodes bearded . . . . . (132) ***Panicum flexile***
2b. Nodes glabrous . . . . . (179) ***Tripidium ravennae***

GROUP 4. AURICLES PRESENT

1a. Auricles claw-like or falcate . . . . . Subgroup 4A
1b. Auricles acute-erect or obtuse . . . . . Subgroup 4B

SUBGROUP 4A. AURICLES CLAW-LIKE OR FALCATE

1a. Rhizomes present 2
1b. Rhizomes absent 3
2a. Rhizomes elongated . . . . . (83) ***Elymus repens***
2b. Rhizomes short . . . . . (116) ***Lolium arundinaceum***
3a. Leaf blade apices attenuate 4
3b. Leaf blade apices acute 5
4a. Ligules erose . . . . . (81) ***Elymus hystrix***
4b. Ligules truncate or entire . . . . . (119) ***Lolium pratense***

5a. Oral hairs ciliate . . . . . (181) ***Triticum aestivum***
5b. Oral hairs lacking 6
6a. Ligules erose . . . . . (111) ***Hordeum murinum***
6b. Ligules truncate or entire 7
7a. Leaf blade margins glabrous or sparsely hairy 8
7b. Leaf blade margins scabrous 12
8a. Plants perennials 9
8b. Plants annuals or biennials 10
9a. Leaves mostly basal; lemma awns curved, spreading . . . . . (79) ***Elymus elymoides***
9b. Leaves basal and cauline; lemma awns, if present, straight . . . . . (118) ***Lolium perenne***
10a. Ligules very short, 0.2–0.8 mm long; nodes brown . . . . . (112) ***Hordeum pusillum***
10b. Ligules 1–2 mm long; nodes not brown 11
11a. Plants annuals; lower leaf sheaths pilose . . . . . (113) ***Hordeum vulgare***
11b. Plants annuals or biennials; leaf sheaths glabrous or hirsute . . . . . (160) ***Secale cereale***
12a. Butt sheaths scarious . . . . . (80) ***Elymus glabriflorus***
12b. Butt sheaths not scarious 13
13a. Leaves mostly basal 14
13b. Leaves basal and cauline 15
14a. Ligules purple; leaves drooping; spikes straight . . . . . (82) ***Elymus macgregorii***
14b. Ligules not colored; leaves ascending; spikes deflexed or drooping . . . . . (78) ***Elymus canadensis***
15a. Plants perennials; spikelet packing broadside to rachis . . . . . (86) ***Elymus virginicus***
15b. Plants annuals or short lived perennials; spikelet packing adaxial, 2-rowed . . . . . (117) ***Lolium multiflorum***

SUBGROUP 4B. AURICLES ACUTE-ERECT OR OBTUSE

1a. Rhizomes elongated and scaly . . . . . (167) ***Sorghastrum nutans***
1b. Rhizomes absent 2
2a. Leaf blade apices acuminate . . . . . (14) ***Anthoxanthum odoratum***
2b. Leaf blade apices acute or obtuse 3
3a. Leaf blades filiform . . . . . (97) ***Festuca filiformis***
3b. Leaf blades linear 4
4a. Leaf sheaths closed for less than 1/3 their length, butt sheaths persistent, fibrous . . . . . (103) ***Festuca trachyphylla***
4b. Leaf sheaths open, butt sheaths not fibrous 5
5a. Leaf blade margins pubescent or sparsely hairy . . . . . (85) ***Elymus villosus***
5b. Leaf blade margins scaberulous or scabrous 6
6a. Culms slender; ligules erose; leaf blades lax . . . . . (84) ***Elymus riparius***
6b. Culms not slender; ligules obtuse or acute; leaf blades straight . . . . . (146) ***Phleum pratense***

GROUP 5. LEAF BLADES FILIFORM

1a. Culms zigzag . . . . . (16) ***Aristida dichotoma***
1b. Culms not zigzag 2
2a. Leaf sheaths tubular 3/4 of their length . . . . . (101) ***Festuca rubra***
2b. Leaf sheaths open 3
3a. Ligules a fringe of hairs . . . . . (44) ***Danthonia compressa***
3b. Ligules eciliate membranes 4
4a. Leaf sheath margins smooth, becoming curled when old . . . . . (23) ***Avenella flexuosa***
4b. Leaf sheath margins scabrous, straight when old 5
5a. Plants annuals; culms usually solitary; leaf sheaths scabrous . . . . . (6) ***Aira caryophyllea***
5b. Plants perennials, caespitose; culms numerous; leaf sheaths glabrous or sparsely hairy 6
6a. Leaf sheaths closed 1/3 of their length, butt sheaths fibrous, investing in culm bases . . . . . (103) ***Festuca trachyphylla***
6b. Leaf sheaths open, butt sheaths not fibrous . . . . . (148) ***Piptochaetium avenaceum***

GROUP 6. LEAF BLADE APICES ATTENUATE

1a. Rhizomes present 2
1b. Rhizomes absent 3
2a. Rhizomes short and knotty; leaf sheaths keeled . . . . . (178) ***Tridens flavus* var. *flavus***
2b. Rhizomes elongated and scaly; leaf sheaths not keeled . . . . . (127) ***Muhlenbergia sobolifera***
3a. Leaf blades flaccid; culms robust; leaf blade margins cartilaginous . . . . . (162) ***Setaria italica***
3b. Leaf blades firm; culms not robust; leaf blade margins not cartilaginous 4
4a. Ligules ciliate membranes 5
4b. Ligules not ciliate membranes 6
5a. Plants perennials; leaf blade bases broadly rounded . . . . . (67) ***Dichanthelium villosissimum***
5b. Plants annuals; leaf blade bases not rounded . . . . . (130) ***Panicum capillare***
6a. Ligules a fringe of hairs 7
6b. Ligules eciliate membranes 14
7a. Culms wiry; lemma awns 3-branched . . . . . (18) ***Aristida oligantha***
7b. Culms not wiry; lemmas awnless, mucornate or short-awned, never 3-branched 8
8a. Leaf blades sheaths inflated . . . . . (176) ***Sporobolus neglectus***
8b. Leaf blades sheaths not inflated 9
9a. Leaf sheaths longer than internodes 10
9b. Leaf sheaths shorter than internodes 11
10a. Culms very slender; leaf blade margins sparsely hairy . . . . . (58) ***Dichanthelium linearifolium***
10b. Culms not slender; leaf blade margins pubescent . . . . . (53) ***Dichanthelium depauperatum***
11a. Rootstocks evident . . . . . (54) ***Dichanthelium dichotomum***
11b. Rootstocks lacking 12
12a. Caespitose perennials; leaf blades lanceolate . . . . . (46) ***Dichanthelium aciculare***
12b. Solitary or caespitose annuals; leaf blades linear 13
13a. Leaf blades 2–8 mm wide; panicles erect; spikelets not subtended by bristles . . . . . (96) ***Eriochloa contracta***
13b. Leaf blades 10–20 mm wide; panicles nodding; spikelets subtended by (1–)3(–6) bristles. . . . . (161) ***Setaria faberi***
14a. Ligules erose; plants perennials . . . . . (81) ***Elymus hystrix***
14b. Ligules not erose; plants annuals or short-lived perennials 15
15a. Ligules acute or attenuate; leaf blade with midrib widened . . . . . (73) ***Diplachne fusca* subsp. *fascicularis***
15b. Ligules truncate; leaf blade midrib not widened . . . . . (98) ***Festuca myuros***

GROUP 7. LEAF SHEATHS KEELED OR CONSPICUOUSLY COMPRESSED

1a. Leaf blades distichous, apices pungent . . . . . (41) ***Coleataenia rigidula***
1b. Leaf blades not distichous, apices not pungent 2
2a. Oral hairs ciliate . . . . . (36) ***Cenchrus longispinus***
2b. Oral hairs lacking 3
3a. Culm internodes elliptical in cross section 4
3b. Culm internodes terete 5
4a. Rhizomes elongated . . . . . (153) ***Poa compressa***
4b. Rhizomes lacking . . . . . (77) ***Eleusine indica***
5a. Leaf blade apices abruptly acute, obtuse, or hooded 6
5b. Leaf blade apices not abruptly acute or obtuse or hooded 9
6a. Rhizomes present, elongated . . . . . (156) ***Poa pratensis***
6b. Rhizomes absent 7
7a. Leaf blades flaccid . . . . . (155) ***Poa palustris***
7b. Leaf blades firm, straight 8
8a. Plants annuals; stolons absent . . . . . (151) ***Poa annua***
8b. Plants perennials; stolons present . . . . . (158) ***Poa trivialis***
9a. Ligules absent . . . . . (74) ***Echinochloa crusgalli***
9b. Ligules present 10

10a. Ligules ciliate or ciliolate membranes 11
10b. Ligules eciliate membrane 12
11a. Leaf blade margins glabrous; culms branching, ample . . . . . (13) ***Andropogon virginicus***
11b. Leaf blade margins scabrous; culms branching, sparse . . . . . (10) ***Andropogon glomeratus***
12a. Rhizomes present 13
12b. Rhizomes lacking 15
13a. Culm lateral branches ample . . . . . (159) ***Schizachyrium scoparium***
13b. Culms unbranched 14
14a. Leaf sheaths laterally compressed, glabrous or pilose . . . . . (40) ***Coleataenia anceps***
14b. Leaf sheaths keeled, scaberulous . . . . . (125) ***Muhlenbergia glomerata***
15a. Basal innovations flabellate . . . . . (43) ***Dactylis glomerata***
15b. Basal innovations subterete 16
16a. Leaf blade margins glabrous; butt sheaths with white hairs . . . . . (70) ***Digitaria filiformis***
16b. Leaf blade margins not glabrous; butt sheaths without white hairs 17
17a. Plants annuals; culms decumbent or prostrate, much branched . . . . . (72) ***Digitaria sanguinalis***
17b. Plants perennials; culms erect or geniculately ascending, unbranched . . . . . (141) ***Paspalum laeve***

GROUP 8. LEAF BLADE BASES BROADLY ROUNDED, CORDATE, OR AMPLEXICAUL

1a. Leaf blade bases broadly rounded 2
1b. Leaf blade bases cordate or amplexicaul 7
2a. Rhizomes present 3
2b. Rhizomes absent 5
3a. Leaves distichous . . . . . (108) ***Gymnopogon ambiguus***
3b. Leaves not distichous 4
4a. Internodes glandular (below nodes); lateral branches ample . . . . . (65) ***Dichanthelium scoparium***
4b. Internodes not glandular; culms unbranched . . . . . (143) ***Paspalum setaceum***
5a. Nodes glabrous; leaf blade margins cartilaginous . . . . . (62) ***Dichanthelium oligosanthes***
5b. Nodes bearded; leaf blade margins not cartilaginous 6
6a. Lateral branches ample or sparse; leaf blade bases tuberculate-ciliate . . . . . (47) ***Dichanthelium acuminatum***
6b. Lateral branches lacking; leaf blade bases scabrous . . . . . (60) ***Dichanthelium mattamuskeetense***
7a. Leaf blade bases amplexicaul . . . . . (51) ***Dichanthelium columbianum***
7b. Leaf blade bases cordate 8
8a. Internodes glandular (below nodes); butt sheaths woolly . . . . . (65) ***Dichanthelium scoparium***
8b. Internodes not glandular; butt sheaths not woolly 9
9a. Rootstocks evident 10
9b. Rootstocks lacking 11
10a. Ligules ciliate membranes; leaf blades flaccid . . . . . (56) ***Dichanthelium latifolium***
10b. Ligules a fringe of hairs or absent; leaf blades firm or stiff . . . . . (52) ***Dichanthelium commutatum***
11a. Leaf blade apices acuminate 12
11b. Leaf blade apices acute 13
12a. Ligules a fringe of hairs . . . . . (50) ***Dichanthelium clandestinum***
12b. Ligules eciliate membranes . . . . . (64) ***Dichanthelium scabriusculum***
13a. Culms from knotted crowns; ligules ciliate membranes . . . . . (49) ***Dichanthelium boscii***
13b. Culms not from knotted crowns; ligules a fringe of hairs or absent 14
14a. Butt sheaths villous with white hairs; leaf blade surfaces pubescent . . . . . (47) ***Dichanthelium acuminatum***
14b. Butt sheaths glabrous or sparsely hairy; leaf blade surfaces glabrous . . . . . (66) ***Dichanthelium sphaerocarpon***

GROUP 9. ORAL HAIRS BEARDED

1a. Rootstocks evident; culms robust . . . . . (95) ***Erianthus giganteus***
1b. Rootstocks not evident; culms not robust 2

2a. Ligules ciliolate membranes . . . . . (122) ***Miscanthus sinensis***
2b. Ligules not ciliolate membranes 3
3a. Ligules eciliate membranes . . . . . (30) ***Bromus pubescens***
3b. Ligules a fringe of hairs 4
4a. Culms with ample branching . . . . . (89) ***Eragrostis frankii***
4b. Culms not branched 5
5a. Leaf sheaths tubular or closed most of their length . . . . . (48) ***Dichanthelium annulum***
5b. Leaf sheaths open 6
6a. Leaf blades filiform, curled or flexuous . . . . . (45) ***Danthonia spicata***
6b. Leaf blades linear straight 7
7a. Plants annuals 8
7b. Plants perennials 9
8a. Leaf sheath surfaces glabrous, outer margins hairy . . . . . (87) ***Eragrostis capillaris***
8b. Leaf sheath surfaces glabrous below, hairy at summit . . . . . (92) ***Eragrostis pectinacea***
9a. Leaf blade margins scabrous, apices acuminate . . . . . (163) ***Setaria parviflora***
9b. Leaf blade margins glabrous, apices acute . . . . . (94) ***Eragrostis spectabilis***

GROUP 10. LEAF BLADES LANCEOLATE

1a. Rhizomes present 2
1b. Rhizomes absent 4
2a. Rhizomes elongated, scaly . . . . . (169) ***Sorghum halepense***
2b. Rhizomes short, knotty 3
3a. Leaf blade apices acute; ligules ciliolate membranes . . . . . (38) ***Chasmanthium laxum***
3b. Leaf blade apices acuminate; ligules eciliate membranes . . . . . (24) ***Brachyelytrum erectum***
4a. Leaf blade bases abruptly and strongly constricted . . . . . (55) ***Dichanthelium ensifolium***
4b. Leaf blade bases not constricted 5
5a. Ligules eciliate membranes . . . . . (142) ***Paspalum pubiflorum***
5b. Ligules ciliate membranes or a fringe of hairs 6
6a. Ligules ciliate membranes 7
6b. Ligules a fringe of hairs 9
7a. Plants annuals, rooting at lower nodes . . . . . (133) ***Panicum gattingeri***
7b. Plants perennials, lower nodes not rooting 8
8a. Leaf blade margins scabrous, tapering at both ends . . . . . (68) ***Dichanthelium yadkinense***
8b. Leaf blade margins glabrous, not tapering at both ends . . . . . (59) ***Dichanthelium lucidum***
9a. Leaf blade apices acuminate . . . . . (63) ***Dichanthelium ravenelii***
9b. Leaf blade apices acute 10
10a. Leaf blade margins sparsely hairy; lateral branches sparse (61) . . . . . ***Dichanthelium meridionale***
10b. Leaf blade margins hairy cartilaginous; lateral branches ample . . . . . (62) ***Dichanthelium oligosanthes***

GROUP 11. ROOTING AT LOWER NODES

1a. Leaf sheaths tubular or closed 1/3 to 1/2 of their length 2
1b. Leaf sheaths open 3
2a. Leaf sheaths tubular . . . . . (106) ***Glyceria septentrionalis***
2b. Leaf sheaths closed 1/3 to 1/2 of their length . . . . . (158) ***Poa trivialis***
3a. Leaf blades ribbed 4
3b. Leaf blades not ribbed 5
4a. Leaf blade apices acuminate; rhizomes elongated . . . . . (3) ***Agrostis gigantea***
4b. Leaf blade apices acute; rhizomes absent . . . . . (5) ***Agrostis perennans***
5a. Ligules absent; leaf blade margins spinulose . . . . . (75) ***Echinochloa muricata***
5b. Ligules present; leaf blade margins not spinulose 6
6a. Leaf blades flaccid . . . . . (115) ***Leersia virginica***
6b. Leaf blades firm 7

7a. Rhizomes present 8
7b. Rhizomes absent 9
8a. Rhizomes elongated; leaf blade margins spinulose . . . . . (114) ***Leersia oryzoides***
8b. Rhizomes short; leaf blade margins not spinulose . . . . . (51) ***Dichanthelium columbianum***
9a. Ligules a fringe of hairs . . . . . (136) ***Panicum verrucosum***
9b. Ligules not a fringe of hairs 10
10a. Leaf blade apices attenuate . . . . . (133) ***Panicum gattingeri***
10b. Leaf blade apices not attenuate 11
11a. Ligules ciliate or ciliolate membranes 12
11b Ligules eciliate membranes 13
12a. Culms branching freely; leaf blade margins scabrous . . . . . (131) ***Panicum dichotomiflorum***
12b. Culms unbranched; leaf blade margins glabrous or sparsely hairy . . . . . (126) ***Muhlenbergia schreberi***
13a. Leaf blade apices obtuse or abruptly acute, hooded . . . . . (151) ***Poa annua***
13b. Leaf blade apices acute, not hooded 14
14a. Plants annuals; lemma awns present, straight . . . . . (84) ***Elymus riparius***
14b. Plants perennials; lemmas awnless . . . . . (71) ***Digitaria ischaemum***

GROUP 12. CULMS BRANCHED

1a. Culms sparsely branched 2
1b. Culms with ample branches 11
2a. Leaf blade apices abruptly acute or obtuse 3
2b. Leaf blade apices acute 5
3a. Rhizomes present . . . . . (154) ***Poa cuspidata***
3b. Rhizomes absent 4
4a. Plants perennials; leaf blades flaccid . . . . . (155) ***Poa palustris***
4b. Plants annuals; leaf blades firm 5
5a. Leaf sheaths closed for 1/3 of their length . . . . . (151) ***Poa annua***
5b. Leaf sheaths open . . . . . (99) ***Festuca octoflora***
6a. Ligules a fringe of hairs 7
6b. Ligules ciliate or ciliolate membranes 8
7a. Plants annuals; leaf blade margins tuberculate-ciliate . . . . . (135) ***Panicum philadelphicum***
7b. Plants perennials; leaf blade margins glabrous . . . . . (19) ***Aristida purpurascens***
8a. Ligules eciliate membranes . . . . . (15) ***Apera spica-venti***
8b. Ligules ciliate or ciliolate membranes 9
9a. Plants annuals; leaf blade margins pubescent . . . . . (134) ***Panicum miliaceum***
9b. Plants perennials; leaf blade margins scabrous 10
10a. Leaf blade venations with distinct cross veins; rhizomes knotty . . . . . (37) ***Chasmanthium latifolium***
10b. Leaf blade venations without distinct cross veins; rhizomes, if present, not knotty 11
11a. Butt sheaths sparsely hairy or pubescent . . . . . (11) ***Andropogon gyrans***
11b. Butt sheaths glabrous . . . . . (9) ***Andropogon gerardii***
12a. Culms wiry 13
12b. Culms not wiry 14
13a. Culms zigzag; lemma awns briefly coiled at base of limb . . . . . (16) ***Aristida dichotoma***
13b. Culms straight; lemma awns not coiled at base of limb . . . . . (17) ***Aristida longespica***
14a. Ligules a fringe of hairs . . . . . (135) ***Panicum philadelphicum***
14b. Ligules not a fringe of hairs 15
15a. Ligules eciliate membranes 16
15b. Ligules ciliate or ciliolate membranes 17
16a. Plants annuals; ligules decurrent, attenuate; leaf blade margins glabrous . . . . . (7) ***Alopecurus carolinianus***
16b. Plants perennials; ligules erose; leaf blade margins scabrous . . . . . (159) ***Schizachyrium scoparium***
17a. Rhizomes knotty . . . . . (12) ***Andropogon ternarius***
17b. Rhizomes not knotty . . . . . (51) ***Dichanthelium columbianum***

GROUP 13. RHIZOMES PRESENT

1a. Rhizomes short . . . . . Subgroup 13A
1b. Rhizomes elongated . . . . . Subgroup 13B

SUBGROUP 13A. RHIZOMES SHORT

1a. Leaf blade apices abruptly acute . . . . . (154) ***Poa cuspidata***
1b. Leaf blade apices not abruptly acute 2
2a. Leaf blade apices acuminate . . . . . (24) ***Brachyelytrum erectum***
2b. Leaf blade apices acute 3
3a. Basal innovations flabellate . . . . . (138) ***Paspalum dilatatum***
3b. Basal innovation subterete 4
4a. Rhizomes knotty 5
4b. Rhizomes not knotty 6
5a. Leaf blade margins scabrous . . . . . (37) ***Chasmanthium latifolium***
5b. Leaf blade margins sparsely hairy . . . . . (38) ***Chasmanthium laxum***
6a. Rhizomes scaly . . . . . (115) ***Leersia virginica***
6b. Rhizomes not scaly 7
7a. Leaf blade margins glabrous . . . . . (107) ***Glyceria striata***
7b. Leaf blade margins not glabrous 8
8a. Leaf sheaths closed most of their length; culms wiry . . . . . (120) ***Melica mutica***
8b. Leaf sheaths open; culms not wiry 9
9a. Leaf blade margins pubescent . . . . . (140) ***Paspalum floridanum***
9b. Leaf blade margins scabrous 10
10a. Ligules lacerate; lemmas awnless . . . . . (104) ***Glyceria canadensis***
10b. Ligules obtuse or truncate; lemma awns straight or geniculate . . . . . (20) ***Arrhenatherum elatius***

SUBGROUP 13B. RHIZOMES ELONGATED

1a. Leaf blade apices abruptly acute, hooded; sheaths closed 1/4 to 1/2 of their length . . . . . (156) ***Poa pratensis***
1b. Leaf blade apices not abruptly acute; sheaths open 2
2a. Leaf blade apices attenuate . . . . . (1) ***Agrostis capillaris***
2b. Leaf blade apices not attenuate 3
3a. Leaf blade apices acuminate 4
3b. Leaf blade apices acute 6
4a. Leaf blade surfaces ribbed . . . . . (3) ***Agrostis gigantea***
4b. Leaf blade surfaces not ribbed 5
5a. Leaf blades linear flat when fresh, involute when dry . . . . . (171) ***Spartina pectinata***
5b. Leaf blades linear flat and remain so when dry . . . . . (170) ***Spartina cynosuroides***
6a. Ligules a fringe of hairs . . . . . (175) ***Sporobolus compositus***
6b. Ligules not a fringe of hairs 7
7a. Basal innovations flabellate . . . . . (40) ***Coleataenia anceps***
7b. Basal innovations subterete 8
8a. Leaf blade margins serrate . . . . . (144) ***Phalaris arundinacea***
8b. Leaf blade margins not serrate 9
9a. Leaf sheath margins hyaline 10
9b. Leaf sheath margins not hyaline 11
10a. Culms wiry . . . . . (128) ***Muhlenbergia sylvatica***
10b. Culms not wiry . . . . . (124) ***Muhlenbergia frondosa***
11a. Leaf blade margins pubescent . . . . . (35) ***Calamagrostis cinnoides***
11b. Leaf blade margins scabrous or scabridulous 12
12a. Ligules ciliate membranes . . . . . (137) ***Panicum virgatum***
12b. Ligules eciliate membranes 13

13a. Rhizomes scaly . . . . . (129) ***Muhlenbergia tenuiflora***
13b. Rhizomes not scaly . . . . . (28) ***Bromus inermis***

GROUP 14. LIGULES A FRINGE OF HAIRS

1a. Plants perennials . . . . . (175) ***Sporobolus compositus***
1b. Plants annuals 2
2a. Culms wiry, scabrous; leaf sheaths often inflated . . . . . (177) ***Sporobolus vaginiflorus***
2b. Culms not wiry, glabrous; leaf sheaths not inflated 3
3a. Leaf blade margins scabrous 4
3b. Leaf blade margins glabrous or glandular 5
4a. Leaf sheath outer margins hairy . . . . . (166) ***Setaria viridis***
4b. Leaf sheath outer margins not hairy . . . . . (164) ***Setaria pumila***
5a. Leaf blade surfaces scabrous, glandular or eglandular . . . . . (91) ***Eragrostis minor***
5b. Leaf blade surfaces glabrous, sometimes glandular 6
6a. Crateriform glands wartlike below the nodes; collars indistinct . . . . . (88) ***Eragrostis cilianensis***
6b. Glands lacking below the nodes; collars divided . . . . . (93) ***Eragrostis pilosa***

GROUP 15. INTERNODES PUBESCENT

1a. Ligules absent . . . . . (76) ***Echinochloa walteri***
1b. Ligules present 2
2a. Ligules ciliate membranes . . . . . (134) ***Panicum miliaceum***
2b. Ligules eciliate membranes 3
3a. Plants perennials 4
3b. Plants annuals 5
4a. Leaf blade margins pubescent . . . . . (109) ***Holcus lanatus***
4b. Leaf blade margins scabrous or glabrous . . . . . (30) ***Bromus pubescens***
5a. Leaf sheath surfaces glabrous . . . . . (8) ***Alopecurus myosuroides***
5b. Leaf sheath surfaces densely pilose 6
6a. Leaf sheath surfaces densely pilose; ligules erose . . . . . (27) ***Bromus hordeaceus***
6b. Leaf sheath surfaces retrorsely pilose; ligules obtuse or lacerate . . . . . (29) ***Bromus japonicus***

GROUP 16. LIGULES CILIATE OR CILIOLATE MEMBRANES

1a. Plants stout or robust 2
1b. Plants not stout or robust 3
2a. Leaf sheath surfaces hispid . . . . . (134) ***Panicum miliaceum***
2b. Leaf sheath surfaces glabrous or appressed pubescent . . . . . (168) ***Sorghum bicolor***
3a. Leaf blade margins scabrous 4
3b. Leaf blade margins glabrous or pubescent 6
4a. Plants perennials . . . . . (172) ***Sphenopholis intermedia***
4b. Plants annuals 5
5a. Ligules ciliate membranes; upper leaf blade surfaces sparsely hairy . . . . . (164) ***Setaria pumila***
5b. Ligules ciliate membranes; leaf blade abaxial surfaces scabrous . . . . . (165) ***Setaria verticillata***
6a. Leaf blade margins glabrous or sparsely hairy; ligules ciliolate membranes . . . . . (126) ***Muhlenbergia schreberi***
6b. Leaf blade margins pubescent; ligules eciliate membranes or ciliate membranes . . . . . (174) ***Sphenopholis obtusata***

GROUP 17. LEAF BLADE MARGINS PUBESCENT OR SPARSELY HAIRY

1a. Leaf blade margins pubescent 2
1b. Leaf blade margins sparsely hairy 5
2a. Leaf blade surfaces hirsute or pilose 3
2b. Leaf blade surfaces scabrous or pubescent 4

3a. Leaf sheaths (lower) densely hairy . . . . . (26) ***Bromus commutatus***
3b. Leaf sheaths retrorsely villous . . . . . (31) ***Bromus racemosus***
4a. Ligules lacerate; lemmas awned . . . . . (34) ***Bromus tectorum***
4b. Ligules erose-ciliate; lemmas awnless . . . . . (174) ***Sphenopholis obtusata***
5a. Ligules a fringe of hairs . . . . . (18) ***Aristida oligantha***
5b. Ligules eciliate membranes 6
6a. Leaf sheath surfaces hispid . . . . . (33) ***Bromus sterilis***
6b. Leaf sheath surfaces not hispid 7
7a. Ligules truncate . . . . . (112) ***Hordeum pusillum***
7b. Ligules obtuse . . . . . (32) ***Bromus secalinus***

GROUP 18. LEAF SHEATHS TUBULAR OR PARTIALLY CLOSED

1a. Leaf sheaths tubular for much of their length 2
1b. Leaf sheaths closed part of their length 3
2a. Culms wiry; leaf blade margins glabrous . . . . . (107) ***Glyceria striata***
2b. Culms not wiry; leaf blade margins scabrous . . . . . (120) ***Melica mutica***
3a. Leaf blade margins scabrous . . . . . (100) ***Festuca paradoxa***
3b. Leaf blade margins glabrous 4
4a. Basal innovations intravaginal; butt sheaths fibrous . . . . . (103) ***Festuca trachyphylla***
4b. Basal innovations usually extravaginal; butt sheaths not fibrous 5
5a. Ligules erose; leaf blades stiff . . . . . (102) ***Festuca subverticillata***
5b. Ligules truncate or obtuse; leaf blades flaccid . . . . . (157) ***Poa sylvestris***

GROUP 19. PLANTS ANNUAL

1a. Leaf blades ribbed . . . . . (2) ***Agrostis elliottiana***
1b. Leaf blades not ribbed 2
2a. Apices acuminate . . . . . (22) ***Avena sativa***
2b. Apices acute 3
3a. Leaf blade margins spinulose . . . . . (75) ***Echinochloa muricata***
3b. Leaf blade margins not spinulose 4
4a. Leaf blade apices obtuse, abruptly acute, hooded . . . . . (151) ***Poa annua***
4b. Leaf blade apices acute, not hooded 5
5a. Leaf blade margins scabrous . . . . . (145) ***Phalaris canariensis***
5b. Leaf blade surfaces glabrous or sparsely hairy 6
6a. Ligules erose-ciliate membranes, more or less lacerate, leaf blade margins pubescent . . . . (174) ***Sphenopholis obtusata***
6b. Ligules truncate or obtuse 7
7a. Leaves basal and cauline; nodes brown; inflorescence a spike . . . . . (112) ***Hordeum pusillum***
7b. Leaves mostly basal; nodes not brown; inflorescence a panicle . . . . . (99) ***Festuca octoflora***

GROUP 20. PLANTS PERENNIAL

1a. Leaf blade apices abruptly acute 2
1b. Leaf blade apices acute or acuminate 3
2a. Stolons present; leaf blades flaccid . . . . . (158) ***Poa trivialis***
2b. Stolons absent; leaf blades stiff . . . . . (155) ***Poa palustris***
3a. Leaf blade apices acuminate 4
3b. Leaf blade apices acute 6
4a. Solitary perennials . . . . . (39) ***Cinna arundinacea***
4b. Caespitose perennials 5
5a. Butt sheaths glabrous; ligules obtuse, strongly decurrent . . . . . (123) ***Muhlenbergia capillaris***
5b. Butt sheaths papery; ligules truncate . . . . . (14) ***Anthoxanthum odoratum***

6a. Basal innovations flabellate . . . . . (43) ***Dactylis glomerata***
6b. Basal innovations subterete 7
7a. Leaf sheaths ribbed . . . . . (5) ***Agrostis perennans***
7b. Leaf sheaths not ribbed 8
8a. Ligules absent . . . . . (76) ***Echinochloa walteri***
8b. Ligules present 9
9a. Leaf sheaths pilose with reflexed hairs . . . . . (30) ***Bromus pubescens***
9b. Leaf sheaths not pilose 10
10a. Leaf blades flaccid . . . . . (152) ***Poa autumnalis***
10b. Leaf blades firm 11
11a. Leaf blade margins glabrous . . . . . (4) ***Agrostis hyemalis***
11b. Leaf blade margins scabrous 12
12a. Ligules ciliate, erose-ciliate membranes . . . . . (172) ***Sphenopholis intermedia***
12b. Ligules eciliate membranes 13
13a. Ligules erose 14
13b. Ligules not erose 15
14a. Culms slender; leaf blades lax . . . . . (84) ***Elymus riparius***
14b. Culms not slender; leaf blades ascending . . . . . (105) ***Glyceria laxa***
15a. Butt sheaths scarious . . . . . (80) ***Elymus glabriflorus***
15b. Butt sheaths not scarious 16
16a. Butt sheaths pubescent . . . . . (25) ***Bromus catharticus***
16b. Butt sheaths glabrous 17
17a. Ligules less than 1 mm long . . . . . (110) ***Hordeum jubatum***
17b. Ligules more than 1–6 mm long 18
18a. Ligules lacerate . . . . . (173) ***Sphenopholis nitida***
18b. Ligules acute, obtuse, or truncate 19
19a. Leaves cauline; butt sheaths brown; lemmas awnless . . . . . (146) ***Phleum pratense***
19b. Leaves mostly basal; butt sheaths not brown; lemma awns straight or geniculate . . . . . (20) ***Arrhenatherum elatius***

Descriptions

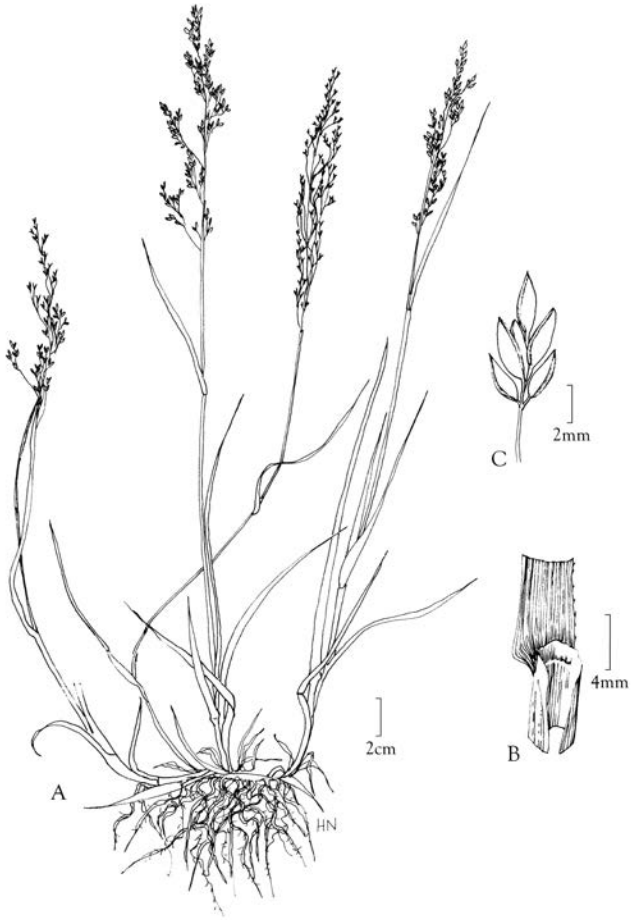

FIGURE 9. *Agrostis capillaris*. A. Habit. B. Sheath, ligule, and blade. C. Branch apex with spikelets. Drawn from *Hitchcock s.n.* (US-838334).

1. *Agrostis capillaris** L.

FIGURE 9

*Agrostis capillaris** L., Sp. Pl. 1: 62. 1753.
Common names: browntop, colonial bent, Rhode Island bent.

Caespitose perennials; rhizomes elongated; stolons absent or present. Culms 10–75 cm tall, erect or geniculately ascending; nodes glabrous; internodes smooth. Leaves mostly basal; sheaths smooth, margins glabrous; ligules 0.3–2 mm long (shorter than wide), eciliate membranes, apex truncate to rounded, sometimes lacerate; blades 3–10 cm long, 1–5 mm wide, linear, flat, surfaces ribbed, smooth or scaberulous, margins glabrous, apex attenuate. Panicles 3–20 cm long, (1–)2–12 cm wide, oblong to ovate, open; primary branches whorled at lower nodes. Spikelets 1–3.5 mm long, lanceolate or oblong, laterally compressed; lemmas awnless.

2. *Agrostis elliottiana* Schult.

FIGURE 10

Agrostis elliottiana Schult., Mant. 2: 202. 1824.
Common name: Elliott's bent.

Delicate caespitose annuals. Culms 8–45 cm tall, weak, erect, sometimes geniculate at the base; internodes glabrous; nodes glabrous. Leaves mostly basal; sheaths smooth, glabrous, margins glabrous; ligules 1.4–4.5 mm long, eciliate membranes, apex obtuse; blades 3–15 cm long, 0.7–2.5 mm wide, linear, flat or conduplicate, ribbed, margins glabrous, apex acute. Panicles 3–20 cm long, 2–12 cm wide, open, oblong to ovate, diffuse, whorled at most nodes. Spikelets 1.2–2.2 mm long, elliptic, laterally compressed; principal lemma awns 3.5–8 mm long, subapical, flexuous without a column.

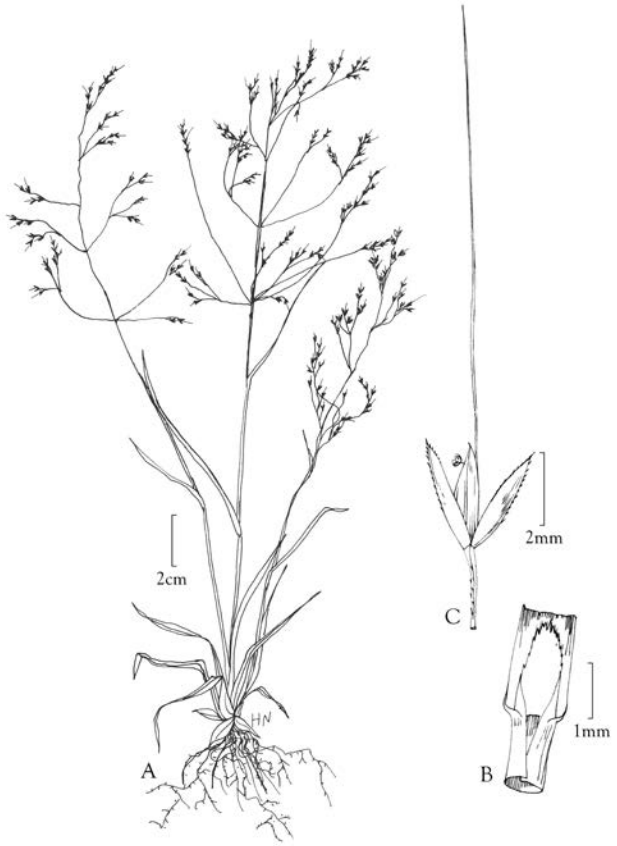

FIGURE 10. *Agrostis elliottiana*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Hotchkiss 1952* (US-1256692).

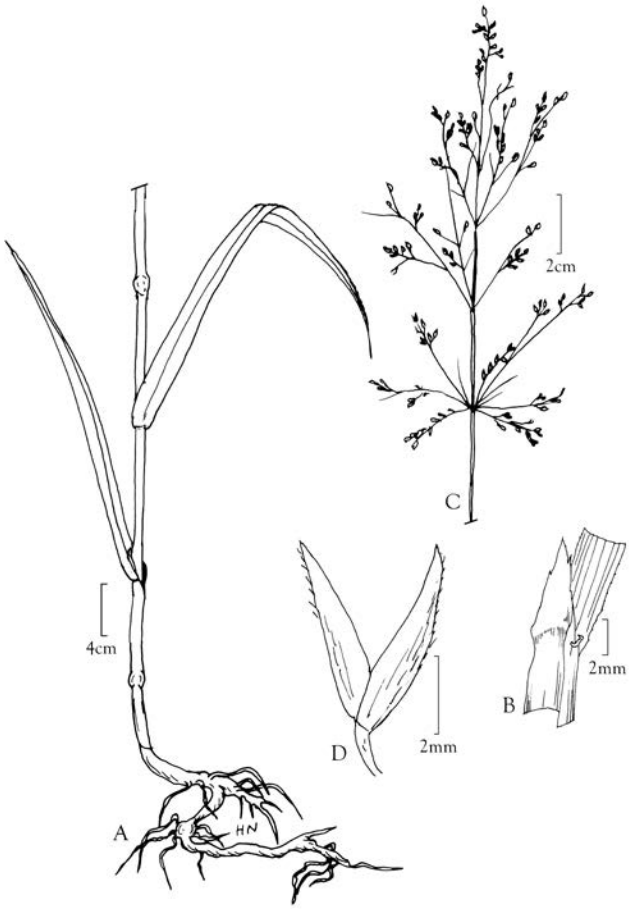

FIGURE 11. *Agrostis gigantea*. A. Culm base. B. Sheath, ligule, and blade. C. Panicle. D. Glumes. A–C drawn from *Lamson-Scribner s.n.* (US-746800); D modified from Barkworth et al. (2007).

3. *Agrostis gigantea** Roth

FIGURE 11

*Agrostis gigantea** Roth, Tent. Fl. Germ. 1: 31. 1788.
Common name: redtop.

Caespitose perennials; rhizomes elongated. Culms 15–82 cm tall, geniculately ascending or decumbent; sometimes rooting from lower nodes; internodes smooth. Leaves basal and cauline; sheaths smooth or scaberulous; ligules 1–4.5 mm long, eciliate membranes, apex rounded to truncate; blades 4–10 cm long and 3–8 mm wide, flat, surfaces ribbed, scaberulous, margins scabrous, apex acuminate. Panicles 8–25(–30) cm long, (1.5–) 3–15 cm wide, open, oblong to ovate, diffuse; primary branches whorled at most nodes. Spikelets 2–3 mm long, lanceolate or oblong, laterally compressed; principle lemmas awnless, rarely mucronate, 0.4–1 mm long.

4. *Agrostis hyemalis* (Walter) Britton, Sterns & Poggenb.

FIGURE 12

Agrostis hyemalis (Walter) Britton, Sterns & Poggenb., Prelim. Cat. 68. 1888.
Common names: hair grass, tickle grass.

Caespitose perennials. Culms 15–82 cm tall, erect, glabrous or sparsely hairy. Leaves cauline and basal; sheaths glabrous; ligules (0.7–)1.2–4 mm long, eciliate membranes, apex lacerate; blades 3–10 cm long, 1–2 mm wide, flat, becoming involute or folded, linear, surfaces and margins glabrous, apex acute. Panicles (5–)10–25(–36) cm long, 4–24 cm wide, open, ovate; diffuse with spikelets clustered toward branch tips; primary branches widely spreading or drooping. Spikelets 1.5–2.1 mm long, ovate to narrowly ovate, elliptic, laterally compressed; principle lemmas awnless.

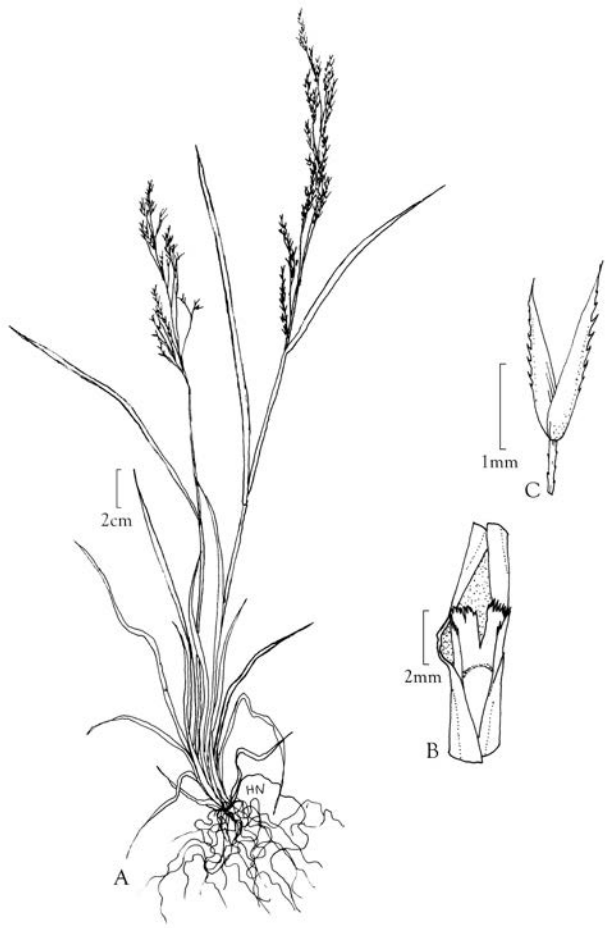

FIGURE 12. *Agrostis hyemalis*. A. Habit. B. Sheath, ligule, and blade. C. Glumes. Drawn from *Ward s.n.* (US-156641).

FIGURE 13. *Agrostis perennans*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Chase 2621* (US-746990).

5. *Agrostis perennans* (Walter) Tuck.

FIGURE 13

Agrostis perennans (Walter) Tuck., Amer. J. Sci. Arts 45: 44. 1843.
Common names: autumn bent, upland bent grass.

Caespitose perennials. Culms 20–80 cm tall, decumbent, weak, sometimes rooting at the lower nodes. Leaves cauline; sheaths ribbed, smooth, glabrous; ligules (0.7–)1.5–7.3 mm long, eciliate membranes, apex lacerate; blades 6–20 cm long, 2–5 mm wide, linear, flat, surface ribbed, scaberulous, margins glabrous, apex acute. Panicles 10–25 cm long, 2.5–11 cm wide, open, ovate, diffuse; whorled at most nodes; branches flexuous. Spikelets 2.2–2.9 mm long, spreading, oblong, laterally compressed; principal lemmas awnless.

6. *Aira caryophyllea** L.

FIGURE 14

*Aira caryophyllea** L., Sp. Pl. 1: 66. 1753.
Common names: common silver hair grass, silver hair grass; silvery hair grass.

Delicate annuals. Culms 4.5–55 cm tall, erect, decumbent, usually solitary, glabrous. Leaves mostly basal; sheaths scaberulous, occasionally smooth; ligules 1.2–8 mm long, eciliate membranes, erose, apex obtuse; blades 0.3–13.5 cm long, 0.3–2.5 mm wide, filiform, involute, surfaces scaberulous, margins scabrous, apex acute. Panicles 1.2–13.5 cm long, 1.5–10 cm wide, open, ovate. Spikelets 2.4–3.1 mm long, oblong to ovate, laterally compressed; principal lemma awns 2.6–3.6 mm long, dorsal, arising just above the base, geniculate.

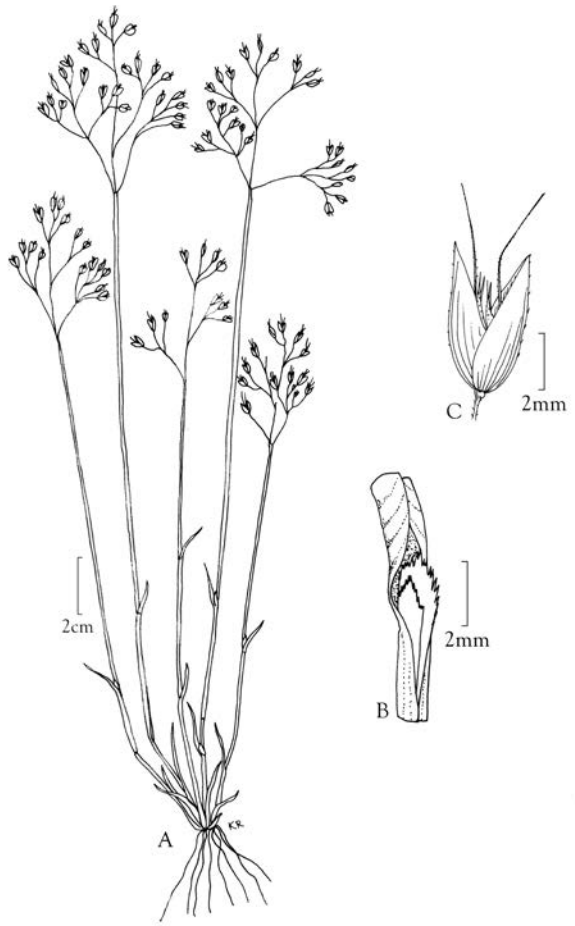

FIGURE 14. *Aira caryophyllea*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Leonard 540* (US-1769679).

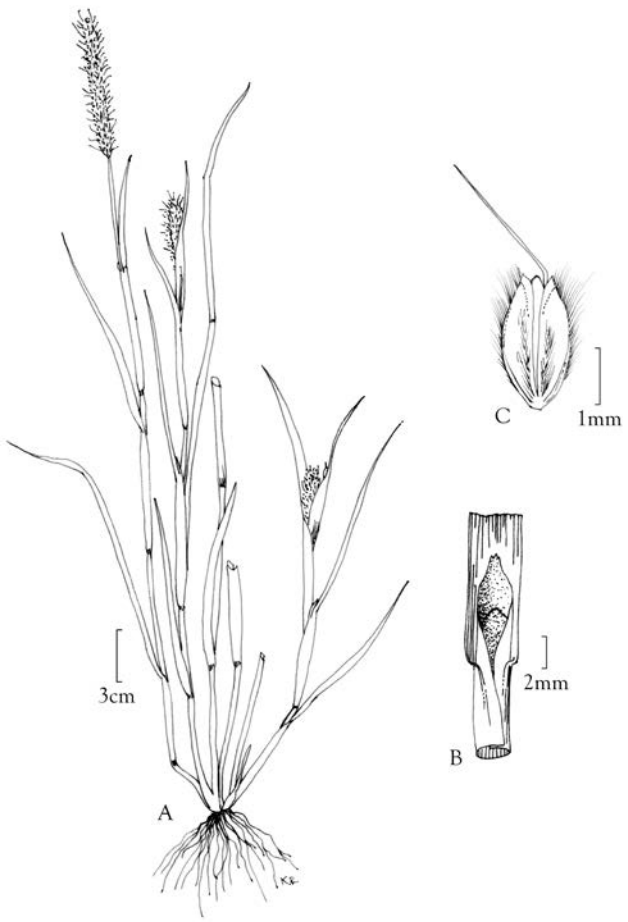

FIGURE 15. *Alopecurus carolinianus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Steury 020430.1* (US-3442323); C modified from Barkworth et al. (2007).

7. *Alopecurus carolinianus* Walter

FIGURE 15

Alopecurus carolinianus Walter, Fl. Carol. 74. 1788.
Common names: tufted alopecurus, tufted foxtail, tufted meadow foxtail.

Caespitose annuals. Culms 5–50 cm tall, glabrous, erect or geniculate at or near the base; branches ample at the base; nodes glabrous, dark color. Leaves basal and cauline; sheaths glabrous, loose or somewhat inflated, especially at the base; ligules 2.8–4.5 mm long, eciliate membranes, decurrent, attenuate to rather blunt and usually erose at the tip; blades 5–12 cm long, 0.9–3 mm wide, linear, flat, upper surfaces scabrous, lower glabrous, margins glabrous, apex acute. Panicles 1–7 cm long, 3–6 cm wide, spiciform, linear. Spikelets 1.8–3 mm long, elliptic, laterally compressed; principal lemma awns 3–5 mm long, dorsal, arising just above the base, geniculate, with a twisted column.

8. *Alopecurus myosuroides** Huds.

FIGURE 16

*Alopecurus myosuroides** Huds., Fl. Angl. 1: 23. 1762.
Common names: slender alopecurus, slender foxtail, slender meadow foxtail.

Caespitose annuals. Culms (10–)40–85 cm tall, geniculately ascending or decumbent; culm internodes pubescent. Leaves basal and cauline; sheath surfaces glabrous; ligules 2–6 mm long, eciliate membranes, apex obtuse; blades 3–16 cm long, (2–)3.5–6 mm wide, flat, linear, surfaces scaberulous, rough adaxially or on both sides (abaxially), margins scabrous, apex acute. Panicles 4–12 cm long, 3–7 cm wide, spiciform, linear, tapering above. Spikelets 4.5–7 mm long, oblong, laterally compressed; principal lemma awns 8–14 mm long, dorsal, arising just above the base, geniculate, clearly exserted from spikelet, with a twisted column.

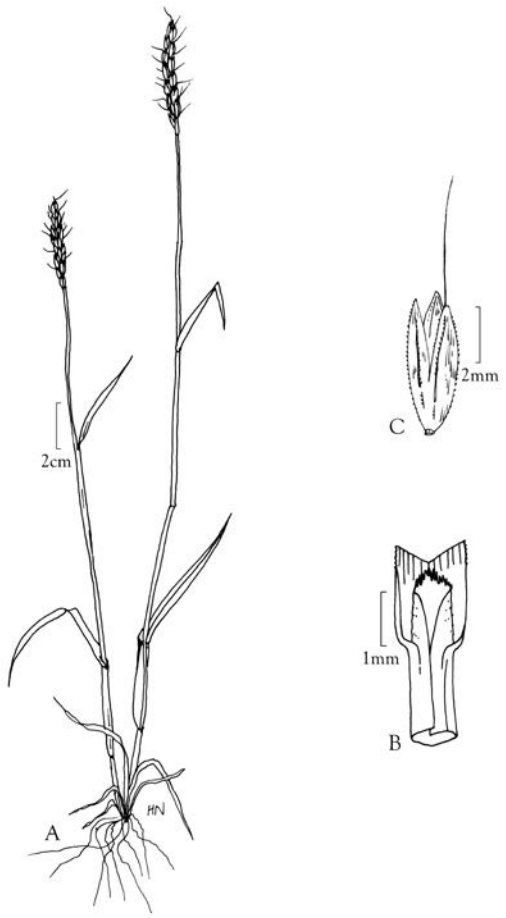

FIGURE 16. *Alopecurus myosuroides*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Chase 6899* (US-906856).

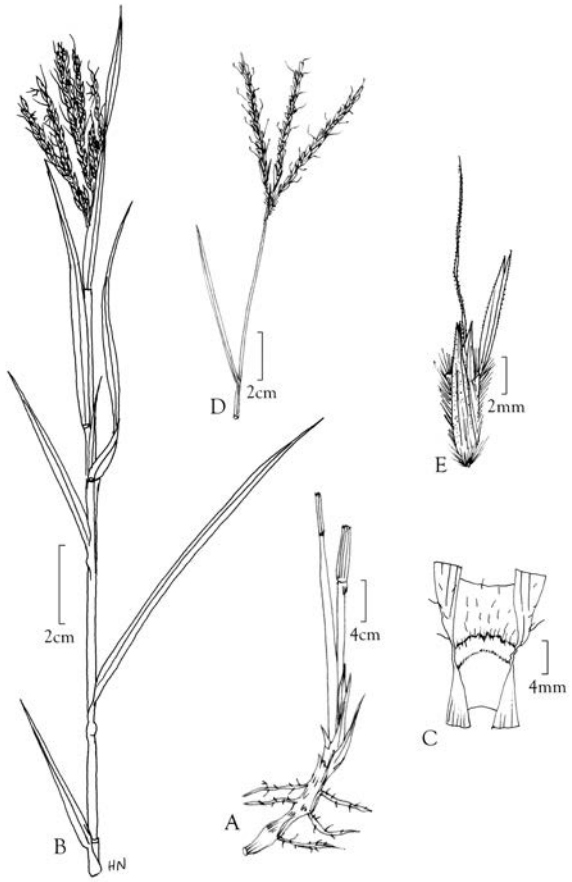

FIGURE 17. *Andropogon gerardii*. A. Base of culm. B. Upper culm habit. C. Sheath, ligule, and blade. D. Inflorescence with three rames. E. Spikelet pair. A–D drawn from *Steele s.n.* (US-363231); E modified from Hitchcock (1951).

9. *Andropogon gerardii* Vitman

FIGURE 17

Andropogon gerardii Vitman, Summa Pl. 6: 16. 1792.
Common names: big bluestem, bluejoint turkeyfoot.

Caespitose perennials, often forming large clump; rhizomes absent or short; butt sheaths glabrous, scarious. Culms 1–3 m tall, often glabrous; lateral branches sparse. Leaves basal and cauline; ligules 0.4–2.5 mm long, ciliolate membranes; sheaths glabrous or pilose; blades 5–50 cm long, (2–)5–10 mm wide, green or glaucous, linear, flat, surfaces glabrous or hirsute, margins scabrous, apex acute. Rames 2–7 per culm, paired or digitate, terminal; each rame 4–11 cm long, exerted at maturity, usually purplish, sometimes yellowish. Spikelets in pairs; fertile spikelets 5–11 mm long, oblong, sessile, scabrous, dorsally compressed; pedicelled spikelets 3.5–11 mm long, staminate, usually well developed, elliptic; principal lemma awns 8–25 mm long, arising from a sinus, geniculate with a twisted column.

10. *Andropogon glomeratus* (Walter) Britton, Sterns & Poggenb.

FIGURE 18

Andropogon glomeratus (Walter) Britton, Sterns & Poggenb., Prelim. Cat. 67. 1888.
Common names: bushy beard grass, bushy bluestem.

Caespitose perennials; basal innovations flabellate. Culms 20–250 cm tall, erect; internodes sometimes glaucous, compressed; branches erect. Leaves basal and cauline; sheaths keeled, glabrous, outer margins glabrous or hairy; ligules 0.6–2.2 mm long, ciliolate membranes; blades 13–109 cm long, 2.9–9.5 mm wide, flat, linear, surfaces glabrous or sparsely hairy, margins scabrous, apex acute. Inflorescence units 10–600 per culm, numerous, paniculate (oblong), terminal and axillary, dense, feathery; each rame 1.5–3 cm long, embraced at base by subtending leaf or spatheole; spatheole

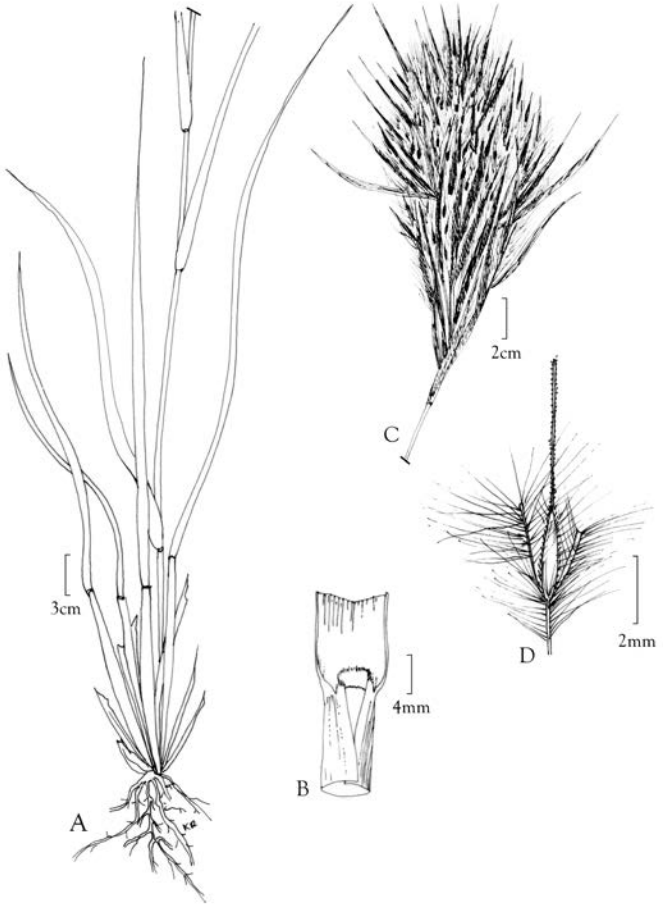

FIGURE 18. *Andropogon glomeratus*. A. Habit. B. Sheath, ligule, and blade. C. Inflorescence. D. Spikelet pair. A, B, drawn from *Chase s.n.* (US-1037180); C modified from Hitchcock (1951); D modified from Barkworth et al. (2003).

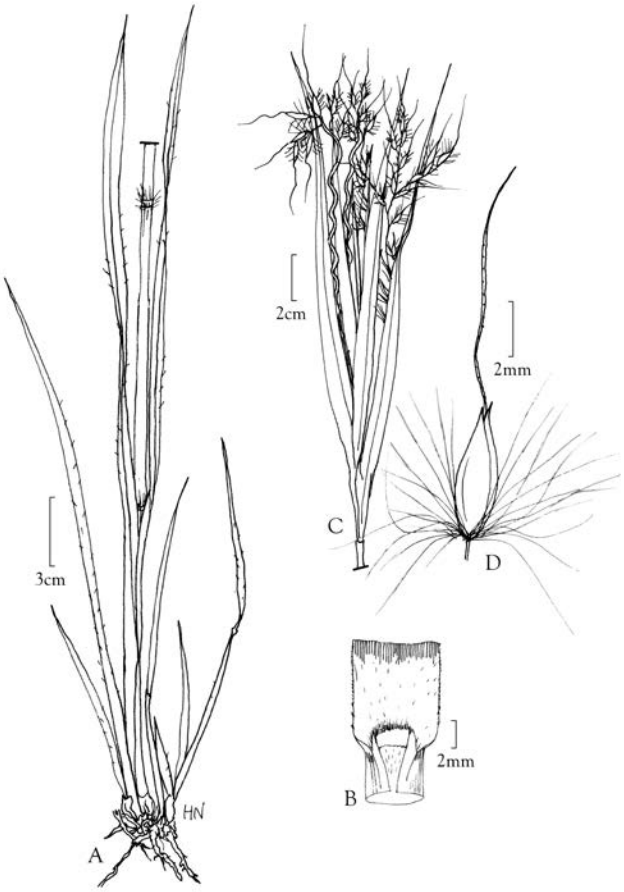

FIGURE 19. *Andropogon gyrans*. A. Habit. B. Sheath, ligule, and blade. C. Inflorescence. D. Sessile spikelet. A, B drawn from *Lamson-Scribner s.n.* (US-740474); C, D modified from Barkworth et al. (2003).

1.5–3 cm long, lanceolate. Spikelets in pairs; fertile spikelets 3–5 mm long, lanceolate, sessile, dorsally compressed; pedicelled spikelets vestigial or absent; principal lemma awns 6–19 mm long, from a sinus, straight.

11. *Andropogon gyrans* Ashe

FIGURE 19

Andropogon gyrans Ashe, J. Elisha Mitchell Sci. Soc. 15: 113. 1898.

Common names: Elliott's beard grass, Elliott's bluestem.

Caespitose perennials; butt sheaths sparsely hairy or pubescent. Culms 30–100(–140) cm tall, erect; internodes usually glaucous; branches erect. Leaves basal and cauline; sheaths smooth; ligules 0.3–1.5 mm long, ciliolate membranes; blades 6–48 cm long, 0.8–5 mm wide, linear, flat or conduplicate, surfaces glabrous or densely pubescent, margins scabrous, sparsely hairy, apex acute. Inflorescence units 2–31 per culm, fasciculate, terminal and axillary; each rame 3–4 cm long, subtended by an inflated sheath and a lanceolate spatheole, exserted or included in the sheath. Spikelets in pairs; fertile spikelets (3–)3.9–4.7 (–5.7) mm long, lanceolate, sessile, dorsally compressed; pedicellate spikelets vestigial or absent; principal lemma awns 10–15 mm long overall, from a sinus, geniculate with twisted column.

12. *Andropogon ternarius* Michx.

FIGURE 20

Andropogon ternarius Michx., Fl. Bor.-Amer. 1: 57. 1803.

Common names: split-beard bluestem, split-beard little bluestem.

Caespitose perennials; butt sheaths glabrous, pilose, or villous with white hairs. Culms 70–150 cm tall, erect, knotty rhizomes; lateral branches ample in upper half to two-thirds. Leaves basal and cauline; sheath surfaces glabrous or villous; ligules 0.4–1.5 mm long, ciliolate membranes; blades 20–70 cm long, 1–3 mm wide, linear, flat or conduplicate, surfaces pubescent or glabrous and glaucous, margins smooth, apex acute. Inflorescence units 2–30 per culm, terminal and axillary; each rame 3–4 cm long, feathery, subtended by a linear spatheole. Spikelets in pairs; fertile spikelets 4.5–8.4 mm long, lanceolate, sessile, dorsally compressed; pedicellate spikelets 1–2 mm long, sterile, represented by single glume; principal lemma awns 15–25 mm long, from a sinus, geniculate with twisted column.

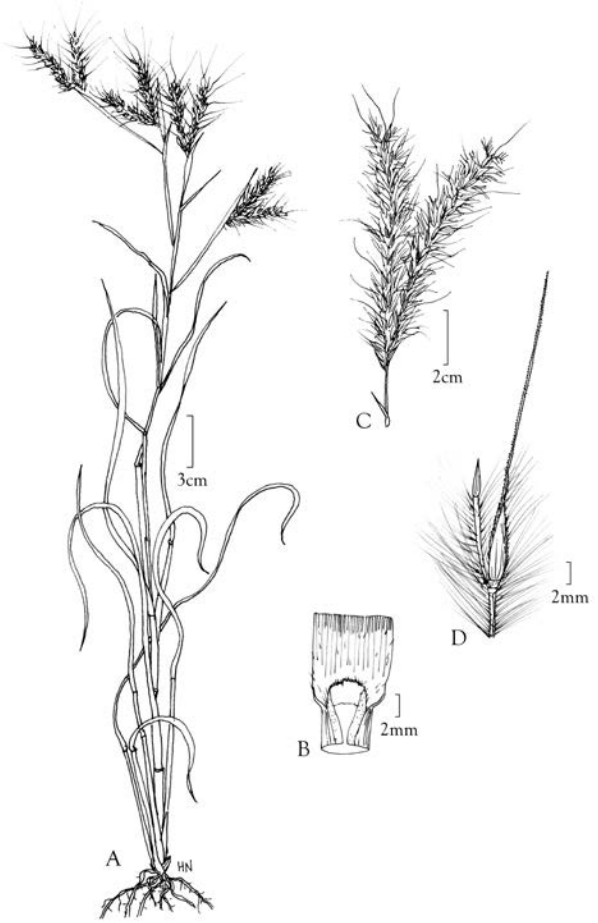

FIGURE 20. *Andropogon ternarius.* A. Habit. B. Sheath, ligule, and blade. C. Inflorescence with two rames. D. Spikelet pair. A, D drawn from *Kanal 647* (US-3268279); B drawn from *Steury 980921* (US-3385694); C modified from Hithchcock (1951).

13. *Andropogon virginicus* L.

FIGURE 21

Andropogon virginicus L., Sp. Pl. 2: 1046. 1753.
Common name: broomsedge.

Caespitose perennials, dense and cylindrical; butt sheaths scarious. Culms 40–210 cm tall, erect; nodes glabrous; internodes usually glaucous, upper two-third freely branching. Leaves basal and cauline; sheaths keeled, glabrous on surface or hispid, outer margins glabrous or hairy; ligules 0.2–1 mm long, ciliolate membranes; blades 11–52 cm long, 1.7–6.5 mm wide, linear, flat or conduplicate, surfaces glabrous, pilose on the upper surface near the base, sometimes glaucous, margins glabrous, apex acute. Inflorescence units 6–195 per culm, lax, terminal and axillary, feathery; each rame 2–3 cm long, paired or digitate, subtended by a spatheole, embraced at base by subtending leaf. Spikelets in pairs; fertile spikelets

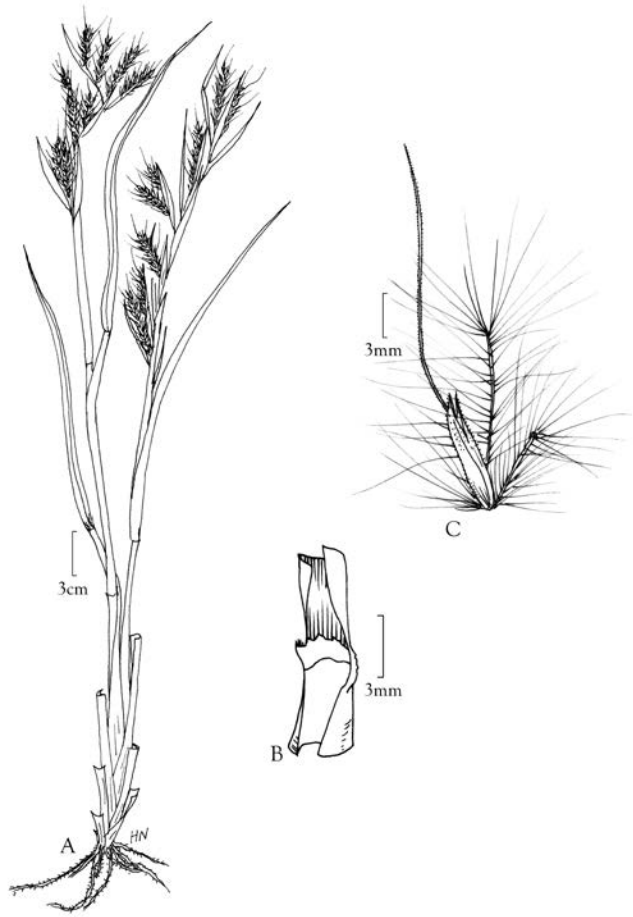

FIGURE 21. *Andropogon virginicus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet pair. Drawn from *Kanal 080* (US-30775156 and *Hitchcock s.n.* (US-740532).

2.5–4 mm long, sessile, lanceolate, dorsally compressed; pedicellate spikelets vestigial to absent, represented by only a pedicel; principal lemma awns 10–26 mm long, from a sinus, straight.

14. *Anthoxanthum odoratum** L.

FIGURE 22

Anthoxanthum odoratum* L., Sp. Pl. 1: 28. 1753.
Common name: sweet vernal grass.

Caespitose perennials; butt sheaths papery. Culms (10–)25–60 (–100) cm tall, with 1–3 nodes, erect or geniculately ascending; lateral branches lacking. Leaves mostly basal; auricles less than 1 mm long or absent; sheath surface and margins pubescent; ligules 2–7 mm long, eciliate membranes, apex truncate; blades 1–31 cm long, 3–10 mm wide, aromatic, linear, flat, surfaces scabrous and pubescent, hairy on both sides, margins glabrous, apex acuminate. Panicles (3–)4–14 cm long, 0.6–1.5 cm wide, spiciform, oblong or ovate, continuous or interrupted. Spikelets 7–9.5 mm long, lanceolate, laterally compressed; principal lemma awns of upper sterile floret 6–9 mm long, dorsal, arising near the base to middle, geniculate.

15. *Apera spica-venti** (L.) P. Beauv.

FIGURE 23

Apera spica-venti* (L.) P. Beauv., Ess. Agrostogr. 31, 151. 1812.
Common name: loose silkybent grass.

Caespitose annuals. Culms 20–80(–120) cm tall, geniculately ascending or decumbent, stout, sparsely branched. Leaves mostly basal; sheath usually purplish, glabrous; ligules 3–6(–12) mm long, eciliate membranes, apex acute or lacerate; blades 6–16(–25) cm long and 2–5(–10) mm wide, linear, flat, surfaces scabrous, rough adaxially or on both sides, margins scabrous, apex acute. Panicles (5–)10–35 cm long, (2–)3–15 cm wide, open, ovate, diffuse; primary panicle branches spreading, whorled at most nodes. Spikelets 2.5–3 mm long, oblong, laterally compressed; principal lemma awns 5–10 mm long, subapical, flexuous.

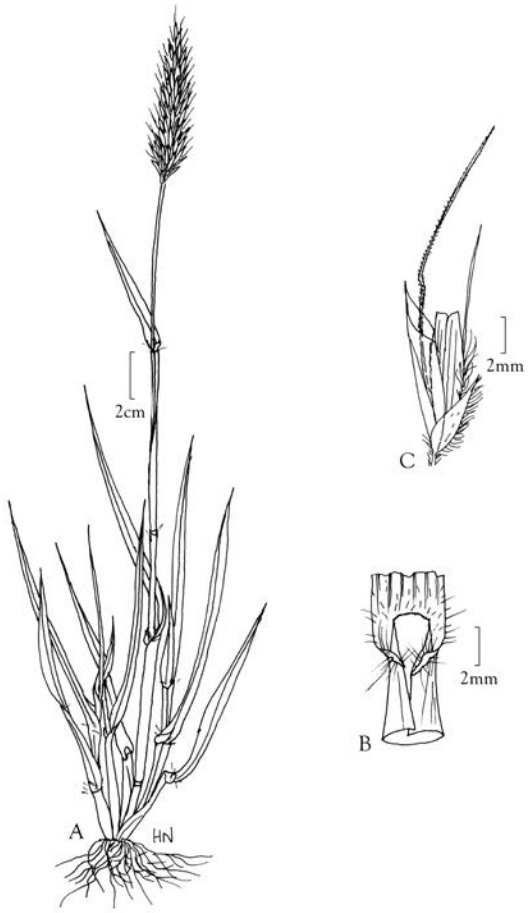

FIGURE 22. *Anthoxanthum odoratum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Donald 129* (US-3557150).

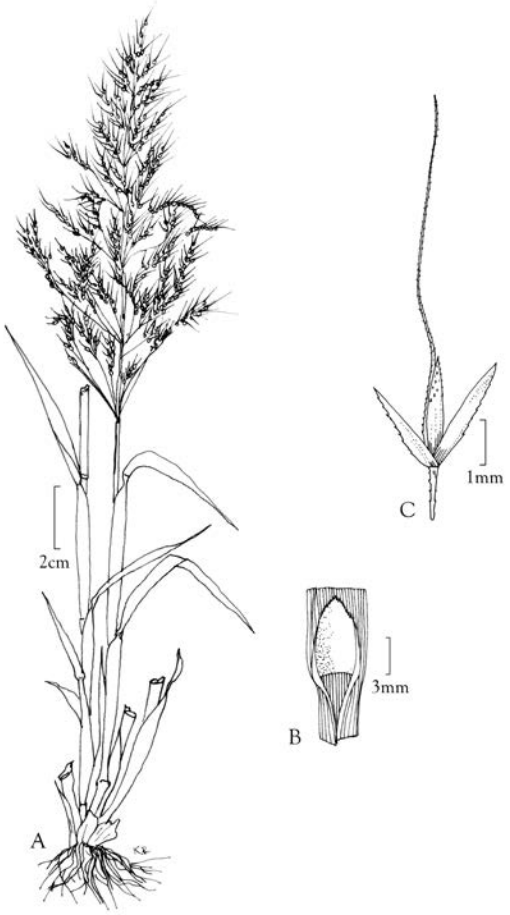

FIGURE 23. *Apera spica-venti*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Chase 2128* (US-2043976).

16. *Aristida dichotoma* Michx.

FIGURE 24

Aristida dichotoma Michx., Fl. Bor.-Amer. 1: 41. 1803.
Common names: churchmouse threeawn, poverty grass.

Caespitose annuals. Culms 15–60 cm tall, wiry; lateral branches ample, arising from mid culm and upper culm glabrous. Leaves basal and cauline; sheaths glabrous on surface or sparsely pilose; ligule less than 0.5 mm long, fringe of hairs; blades 3–10 cm long, 1–2 mm wide, flat or conduplicate, apically filiform, surfaces glabrous or pilose, sparsely hairy, margins glabrous, apex acute. Panicles 2–11 cm long, 0.4–1.1 cm wide, contracted, linear. Spikelets 4–10 mm long, linear, subterete; lower glumes 1-veined; lemmas 3-awned, central awns 3–9 mm long, lateral (2) awns 1–4 mm long, the 3 awns briefly coiled at base of limb, without a column.

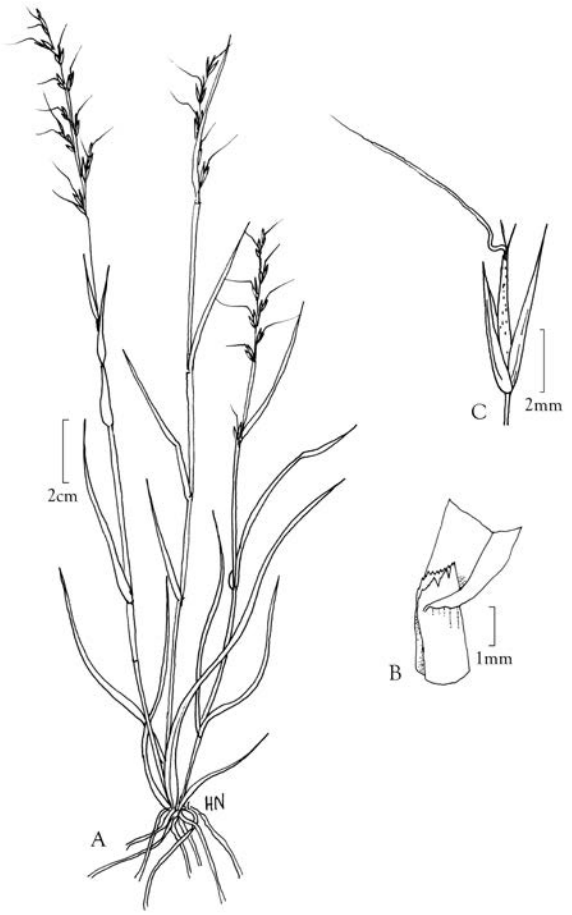

FIGURE 24. *Aristida dichotoma*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 082* (US-3075155); C modified from Barkworth et al. (2003).

17. *Aristida longespica* Poir.

FIGURE 25

Aristida longespica Poir., Encycl., Suppl. 1(2): 452. 1811.
Common names: red threeawn, slim-spike threeawn.

Caespitose annuals; butt sheaths glabrous or pilose with white hairs. Culms 15–65 cm tall; internodes glabrous, geniculately ascending, wiry, usually much branched. Leaves basal and cauline; sheaths glabrous on surface, oral hairs ciliate; ligules about 0.5 mm long, fringe of hairs; blades 5–14 cm long, 1–2 mm wide, flat to involute, surfaces and margins glabrous, apex acute. Panicles 6–22 cm long, 1–4(–6) cm wide, contracted, lanceolate. Spikelets 3–4 mm long, linear, subterete; lower glumes 1-veined; lemmas 3-awned, central awns 6–36 mm long, erect or reflexed, lateral awns absent or up to 18 mm long, the 3 awns not coiled at base, without a column.

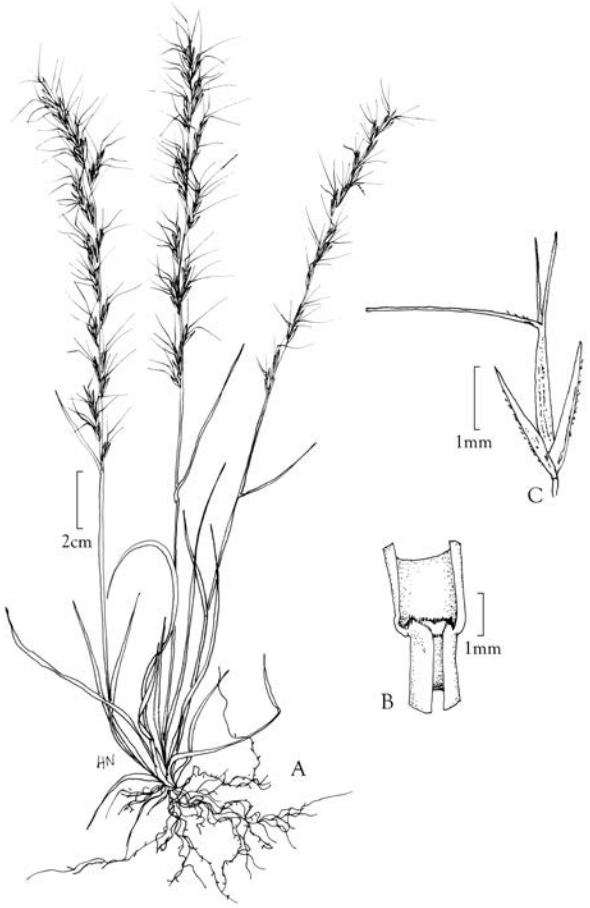

FIGURE 25. *Aristida longespica*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Smith s.n.* (US-1963256); C modified from Barkworth et al. (2003).

18. *Aristida oligantha* Michx.

FIGURE 26

Aristida oligantha Michx., Fl. Bor.-Amer. 1: 41. 1803.
Common name: prairie threeawn.

Caespitose annuals. Culms 25–55 cm tall, wiry; culm internodes distally glabrous; lateral branches ample. Leaves basal and cauline; sheaths glabrous on surface, oral hairs lacking or pubescent; ligules less than 0.5 mm long, fringe of hairs; blades 4–12 cm long, 1–2 mm wide, flat or conduplicate, surfaces glabrous or hispid, sparsely hairy, margins glabrous or sparsely hairy, apex attenuate. Panicles (5–)7–20 cm long, 2–4 cm wide, spicate or racemose, open, oblong, bearing few spikelets. Spikelets 18–25 mm long, linear, subterete; lower glumes 3–7-veined; lemmas 3-awned, awns 12–70 mm long, all the same length, spreading, without a column.

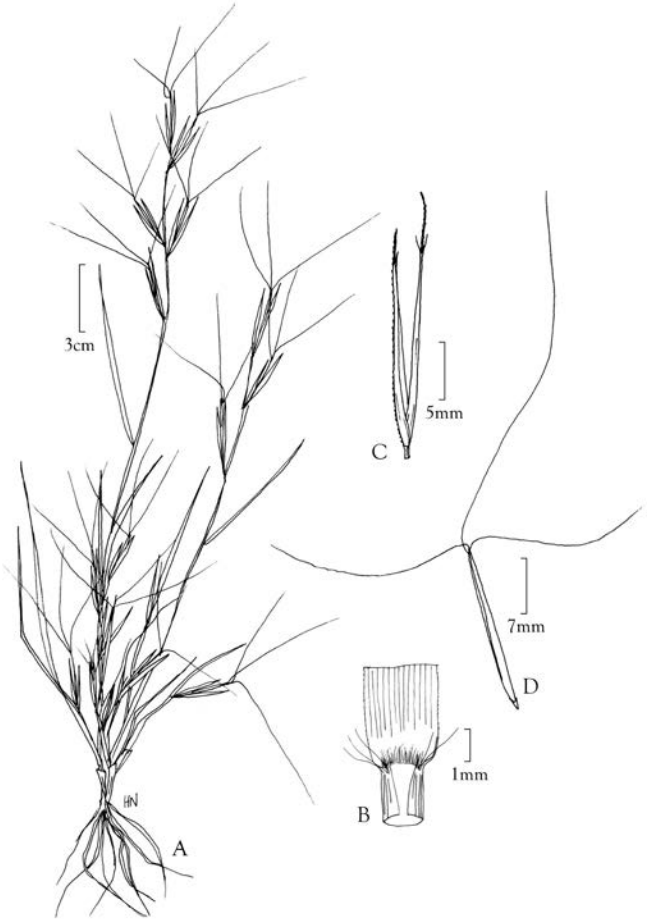

FIGURE 26. *Aristida oligantha*. A. Habit. B. Sheath, ligule, and blade. C. Glumes. D. Floret. A, B drawn from *Chickering s.n.* (US-820678); C, D modified from Hitchcock (1951).

19. *Aristida purpurascens* Poir.

FIGURE 27

Aristida purpurascens Poir., Encycl., Suppl. 1(2): 452. 1811.
Common name: arrowfeather threeawn.

Caespitose perennials, bases knotty, sometimes with very short rhizomes. Culms 40–100 cm tall, 1–4 mm diameter at the base, slender; lateral branches sparse. Leaves basal and cauline; sheaths glabrous on surface, sometimes pubescent; ligules 0.2–0.3 mm long, fringe of hairs; blades 10–25 cm long, 1–3 mm wide, linear, flat or involute, surfaces glabrous, lax, hairless except near base, margins glabrous, apex acute. Panicles (15–)20–55 cm long, 0.5–2(–3) cm wide, contracted, linear. Spikelets 7–10 mm long, linear, subterete; lower glumes 1- or 2-veined; lemmas 3-awned, awns 8–25 mm long, all subequal in length, arcuate or spirally coiled at the base, without a column, central awns twice as thick as lateral awns.

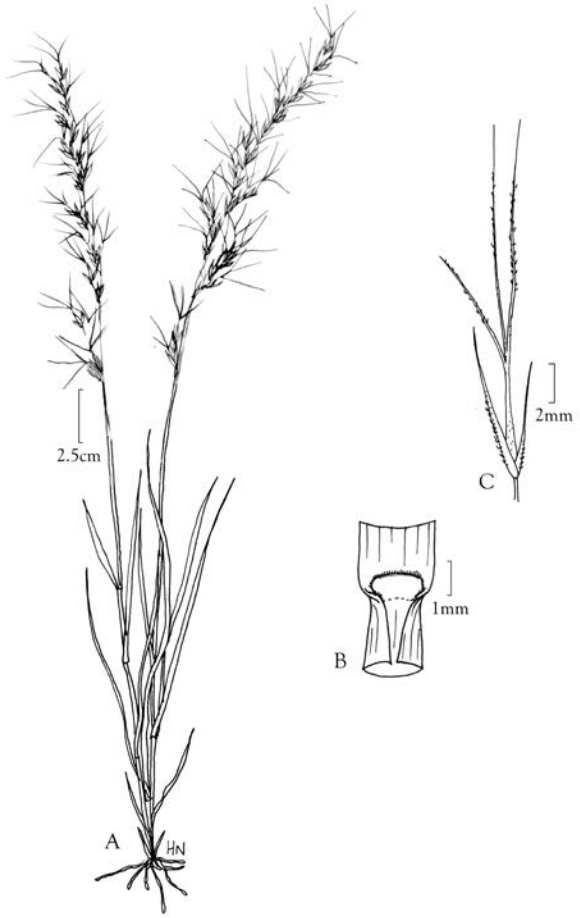

FIGURE 27. *Aristida purpurascens*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Swallen 36* (US-246734); C modified from Barkworth et al. (2003).

20. *Arrhenatherum elatius** (L.) P. Beauv. ex J. Presl & C. Presl

FIGURE 28

*Arrhenatherum elatius** (L.) P. Beauv. ex J. Presl & C. Presl, Fl. Čech. 17. 1819.
Common name: tall oatgrass.

Caespitose perennials; butt sheath glabrous. Culms 50–140 (–180) cm tall, erect, sometimes rhizomatous, swollen, forming moniliform corms, or not swollen; nodes glabrous or pubescent. Leaves mostly basal; sheaths smooth or scaberulous, glabrous on surface, or pilose; ligules 1–3 mm long, eciliate membranes, apex obtuse or truncate, sometimes slightly ciliate; blades 5–32 cm long, (1–)3–8(–10) mm wide, linear, flat, surfaces scaberulous, pilose, sparsely hairy adaxially, margins scabrous, apex acute. Panicles 7–30(–36) cm long, 1–6(–10) cm wide, open, lanceolate or oblong, equilateral or nodding. Spikelets 7–11 mm long, oblong, laterally compressed, 2-flowered; awns of lower lemmas 10–20 mm long, twisted below, geniculate; awns of upper lemmas absent or up to 5 mm long, subapical, straight or geniculate.

21. *Arthraxon hispidus** (Thunb.) Makino

FIGURE 29

*Arthraxon hispidus** (Thunb.) Makino, Bot. Mag. (Tokyo) 26 (307): 214. 1912.
Common names: arthraxon, small carp grass.

Mat-forming annuals. Culms 5–100(–200) cm long, rambling, slender, rooting from lower nodes; internodes glabrous; nodes pubescent, much branched. Leaves basal and cauline; sheaths glabrous on surface, pilose or hispid, with tubercle-based hairs, outer margins glabrous or hairy; ligules 0.4–3.5 mm long, ciliolate membranes; blades 1–7.5 cm long, 4–20 mm wide, lanceolate or ovate, flat, base amplexicaul, surface glabrous or

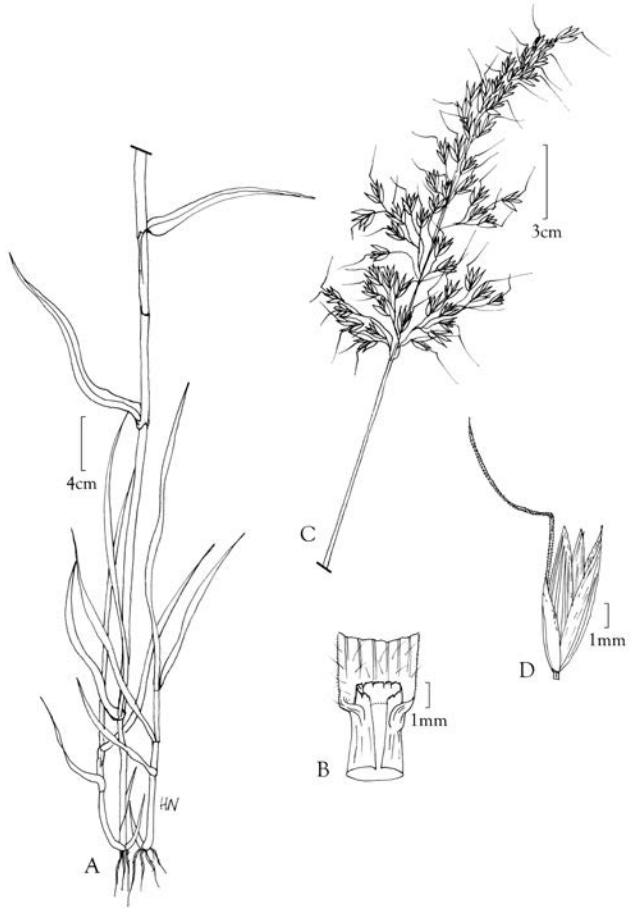

FIGURE 28. *Arrhenatherum elatius*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Allard 9935* (US-1846950); D modified from Hitchcock (1951).

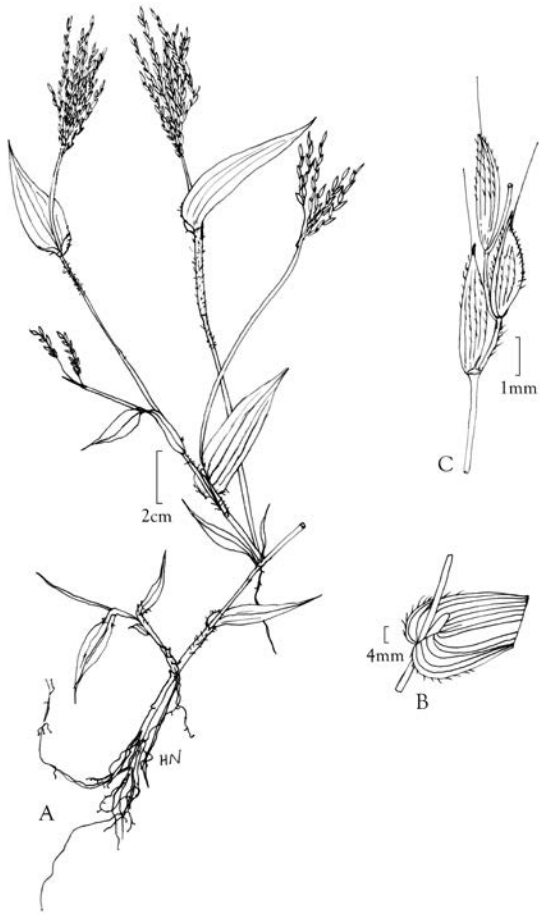

FIGURE 29. *Arthraxon hispidus*. A. Habit. B. Sheath, ligule, and blade. C. Inflorescence branch with three spikelets. A, B drawn from *Wester s.n.* (US-1963329); C modified from Barkworth et al. (2003).

pilose, sparsely hairy, hairy on both sides, margins tuberculate-ciliate, hairy all along or at base, apex acute. Panicles 1.3–7 cm long, flabellate or contracted; 12–20 rames per culm; each rame 1–6(–11) cm long. Spikelets 3–8 mm long, in pairs; sessile spikelets fertile, lanceolate, laterally compressed; pedicellate spikelets absent; principal lemma awns 0–10 mm long, dorsal, sometimes geniculate, straight or twisted.

22. *Avena sativa** L.

FIGURE 30

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

Solitary annuals. Culms 35–180 cm tall, erect. Leaves cauline; sheaths smooth or scaberulous; ligules 2–8 mm long, eciliate membrane, apex truncate to acute; blades 8–45 cm long, 3–14 (–25) mm wide, linear, flat, surfaces and margins scaberulous, rough on both sides, apex acuminate. Panicles (6–)15–40 cm long, 5–15 cm wide, open, pyramidal, diffuse, nodding. Spikelets (18–)25–32 mm long, pendulous, cuneate, laterally compressed; principal lemma awns 25–35 mm long or sometimes unawned, dorsal, arising about halfway from the base, geniculate, twisted.

23. *Avenella flexuosa* (Trin.) Drejer

FIGURE 31

Avenella flexuosa (Trin.) Drejer, Fl. Excurs. Hafn. 32. 1838. [Syn. *Deschampsia flexuosa* (L.) Trin.]
Common names: common hair grass, crinkled hair grass, wavy hair grass.

Caespitose perennials, culms glabrous or pilose; rhizomes absent or elongated. Culms 30–80 cm long, erect or geniculate at the base, wiry. Leaves mostly basal; sheaths glabrous; ligules 1.5–3.6 mm long, eciliate membranes, apex obtuse, sometimes

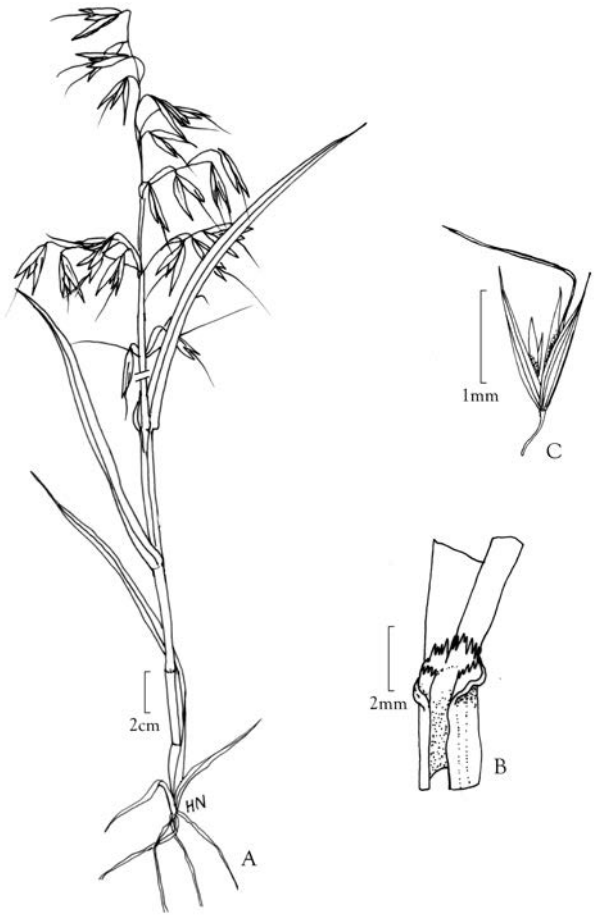

FIGURE 30. *Avena sativa*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Ward s.n.* (US-156655); C modified from Barkworth et al. (2007).

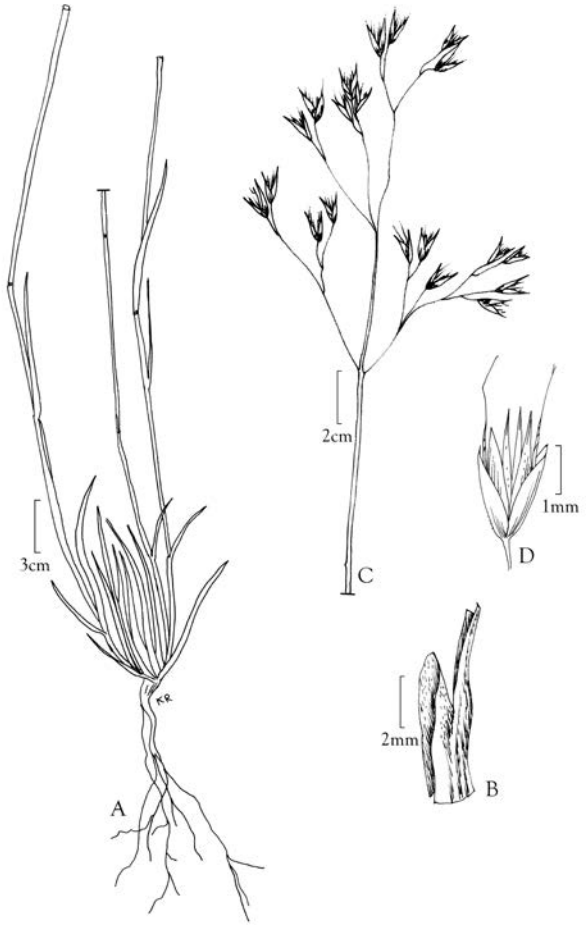

FIGURE 31. *Avenella flexuosa*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Leonard 10244* (US-1769822); D modified from Barkworth et al. (2007).

acute; blades 12–25 cm long, 0.3–0.5 mm wide, filiform, involute, stiff, surfaces and margins smooth, becoming curled when old, apex abruptly acute or acute. Panicles 5–15 cm long, (2–)4–12 cm wide, open, ovate, diffuse. Spikelets 4–7 mm long, oblong or cuneate, laterally compressed; principal lemma awns 4–7 mm long overall, dorsal, arising just above the base of lemma, geniculate, twisted below.

24. *Brachyelytrum erectum* (P. Beauv. ex Schreb.) P. Beauv.

FIGURE 32

Brachyelytrum erectum (P. Beauv. ex Schreb.) P. Beauv., Ess. Agrostogr. 39, 155. 1812.
Common name: southern shorthusk.

Caespitose perennials; rhizomes short, knotty. Culms 34–102 cm tall; internodes distally glabrous or pubescent; nodes pubescent. Leaves cauline; sheaths hispid; ligules 2–3.5 mm long, eciliate membranes, apex lacerate or erose, truncate to acute; blades 8.5–17.5 cm long, (9–)11–17(–20) mm wide, linear or lanceolate, flat, venations without cross veins or with obscure cross veins, surfaces scabrous, sparsely pubescent beneath, margins scabrous, ciliate, apex acuminate. Panicles (5.5–)9.1–14.3(–18.5) cm long, 0.4–0.8 cm wide, open, linear or oblong. Spikelets 10–11 mm long, lanceolate, dorsally compressed to terete; principal lemma awns 13–20 mm long.

FIGURE 32. *Brachyelytrum erectum*. A. Habit. B. Sheath, ligule, and blade. C. Upper portion of culm with panicle. D. Floret. A–C drawn from *Kanal 035* (US-3073417; D modified from Hitchcock (1951).

25. *Bromus catharticus** Vahl.

FIGURE 33

Bromus catharticus* Vahl., Symb. Bot. 2: 22. 1791.
Common name: rescue grass.

Caespitose annuals or perennials; butt sheaths pubescent. Culms 30–120 cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths pubescent; ligules 1–4 mm long, eciliate membranes, apex obtuse, lacerate to erose; blades 4–30 cm long,

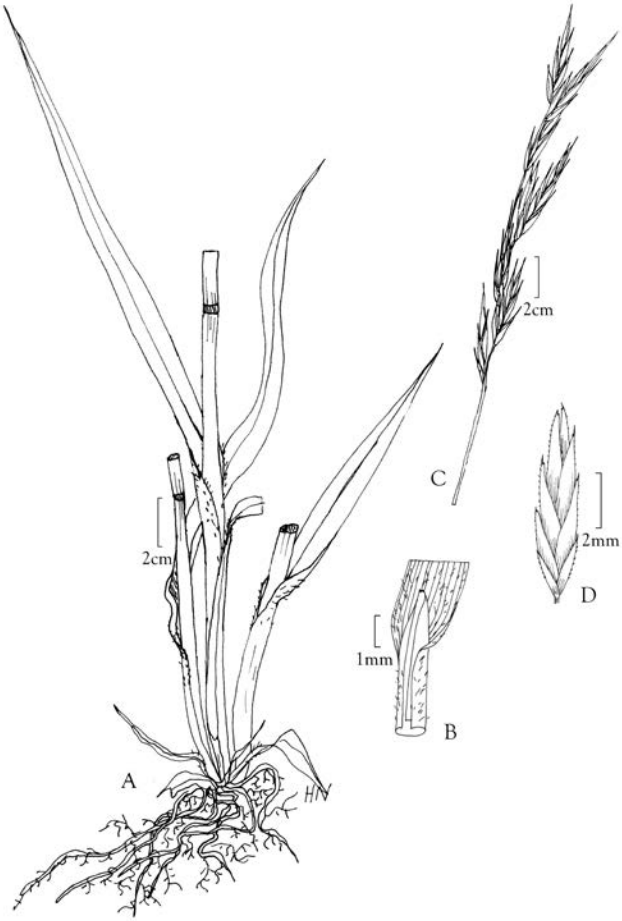

FIGURE 33. *Bromus catharticus*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Kanal 434* (US-3279029).

2–10 mm wide, linear, flat, surfaces glabrous or hairy, margins scabrous, apex acute. Panicles 10–40 cm long, open, oblong, diffuse; branches flexuous. Spikelets (17–)20–40 mm long, 4–10 mm wide, elliptic to lanceolate, strongly laterally compressed; lower glumes 5–7(–9)-veined; lemmas 9–13-veined, strongly keeled; principal lemma awns absent or up to 3.5 mm long, subapical.

26. *Bromus commutatus** Schrad.

FIGURE 34

Bromus commutatus* Schrad., Fl. Germ. 353. 1806.
Common names: hairy chess, meadow brome, upright chess.

Caespitose or solitary annuals. Culms 40–120 cm tall, erect or geniculately ascending. Leaves mostly basal; lower sheaths densely hairy, often with retrorse hairs, upper sheaths pubescent or glabrous; ligules 1–2.5 mm long, eciliate membranes, apex obtuse, erose; blades 9–18 cm long, 2–4 mm wide, linear, flat, surfaces hirsute, margins pubescent, apex acute. Panicles 7–16 cm long, 3–6 cm wide, open, elliptic or oblong, diffuse, nodding. Spikelets 14–18(–30) mm long, 4.5–7 mm wide, lanceolate or oblong, terete to laterally compressed; lower glumes 5-veined; lemmas 7 (9)-veined; principal lemma awns 4–10 mm long, straight, subapical.

27. *Bromus hordeaceus** L.

FIGURE 35

Bromus hordeaceus* L., Sp. Pl. 1: 77. 1753.
Common names: soft brome, soft chess.

Solitary or caespitose annuals. Culms 10–70 cm tall, erect or geniculately ascending; nodes pubescent. Leaves mostly basal; lower sheaths densely pilose, the hairs retrorse; upper sheaths pubescent or glabrous; ligules 1–1.5 mm long, eciliate membranes, apex erose; blades 2–19 cm long, 1–4 mm wide, linear,

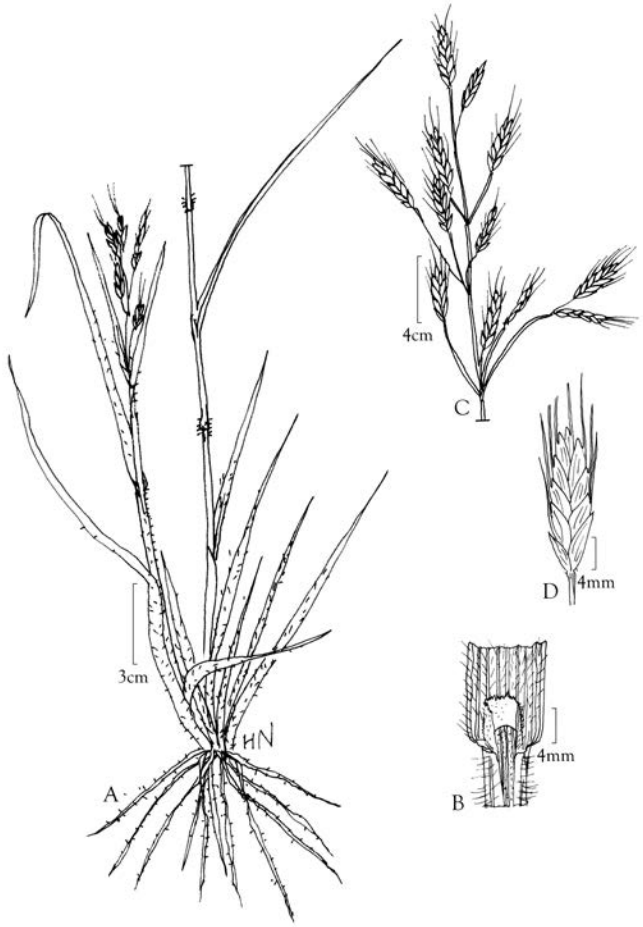

FIGURE 34. *Bromus commutatus*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Leonard 5465* (US-1769745).

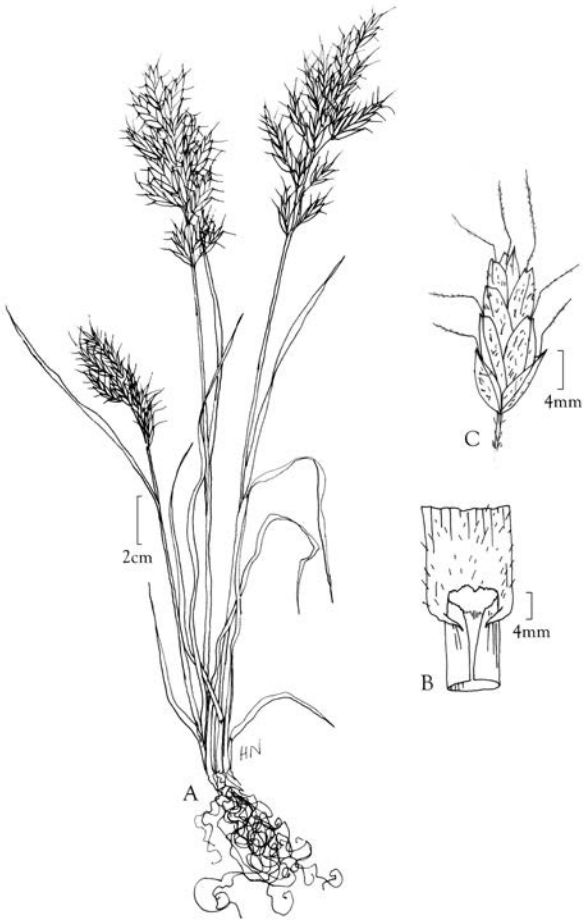

FIGURE 35. *Bromus hordeaceus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Blake s.n.* (US-1646029); C modified from Barkworth et al. (2007).

flat, surfaces and margins hirsute, apex acute. Panicles 1–13 cm long, 1–4 cm wide, open, ovate, equilateral or nodding. Spikelets (11–)14–20(–23) mm long, 3.5–6(–8) mm wide, ovate, terete to laterally compressed; lower glumes 3–5-veined; lemmas 7–9-veined; principal lemma awns 5–10 mm long, subapical.

28. *Bromus inermis** Leyss.

FIGURE 36

*Bromus inermis** Leyss., Fl. Halens. 16. 1761.
Common names: awnless brome, common brome, smooth brome.

Solitary or caespitose perennials; rhizomes elongated; butt sheaths glabrous to pubescent, persistent, and investing base of culm, with fibrous dead sheaths. Culms 50–130 cm tall; internodes usually glabrous, rarely pubescent; nodes glabrous or pubescent. Leaves basal and cauline, sheaths glabrous or puberulous; ligules up to 3 mm long, eciliate membranes, apex truncate to erose; blades 11–35(–42) cm long, 5–15 mm wide, flat, linear, surfaces glabrous, rarely pubescent or pilose, scabrous on both sides, glabrous, margins scabrous, apex acute. Panicles 10–15 cm long, 4–10 cm wide, open or contracted, ovate, dense, equilateral or nodding. Spikelets 20–40 mm long, 3–5 mm wide, elliptic to lanceolate, terete to moderately laterally compressed; lower glumes 1 (3)-veined; lemmas usually 7-veined; principal lemma awns absent or up to 2–3 mm long, straight, subapical.

29. *Bromus japonicus** Thunb. ex Murray

FIGURE 37

*Bromus japonicus** Thunb. ex Murray, Syst. Veg. (ed. 14) 119. 1784.
Common names: Japanese brome, Japanese chess.

Solitary annuals. Culms (22–)30–70 cm tall, erect or geniculately ascending; internodes pubescent. Leaves basal and cauline;

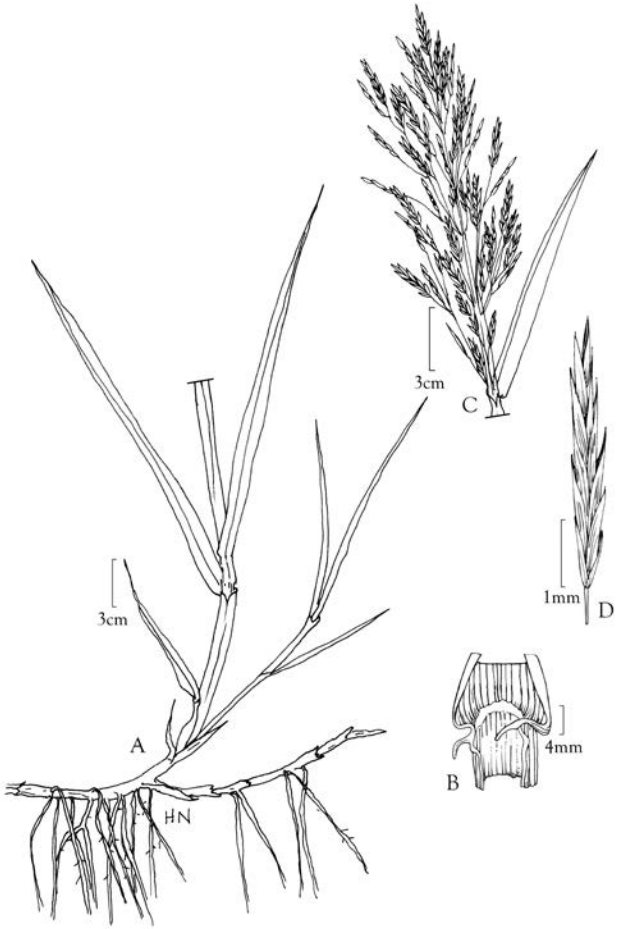

FIGURE 36. *Bromus inermis*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 148* (US-3117677); D modified from Barkworth et al. (2007).

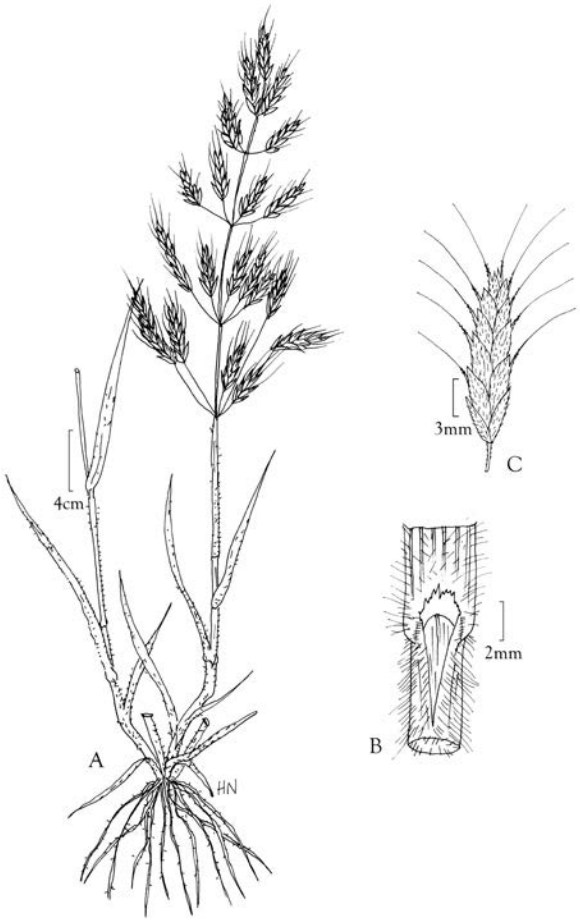

FIGURE 37. *Bromus japonicus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Allard 630* (US-1678979).

sheaths densely pilose; ligules 1–2.2 mm long, eciliate membranes, apex obtuse, lacerate; blades 10–20 cm long, 2–4 mm wide, usually pilose on both sides, linear, flat, surfaces and margins pubescent, apex acute. Panicles 10–22 cm long, 4–13 cm wide, open, ovate, diffuse; primary panicle branches spreading or drooping. Spikelets 15–35(–40) mm long, ovate, terete to moderately laterally compressed; lower glumes (3) 5-veined; lemmas 7 (9)-veined; principal lemma awns 5–16 mm long, shorter on the lower florets, subapical, curved, spreading or reflexed.

30. *Bromus pubescens* Muhl. ex Willd.

FIGURE 38

Bromus pubescens Muhl. ex Willd., Enum. Pl. 1: 120. 1809.
Common names: Canada brome, hairy woodland brome.

Caespitose perennials. Culms 65–120(–150) cm tall; internodes distally glabrous or pubescent; nodes pubescent, sometimes glabrous. Leaves cauline; sheaths pilose, with reflexed hairs, upper

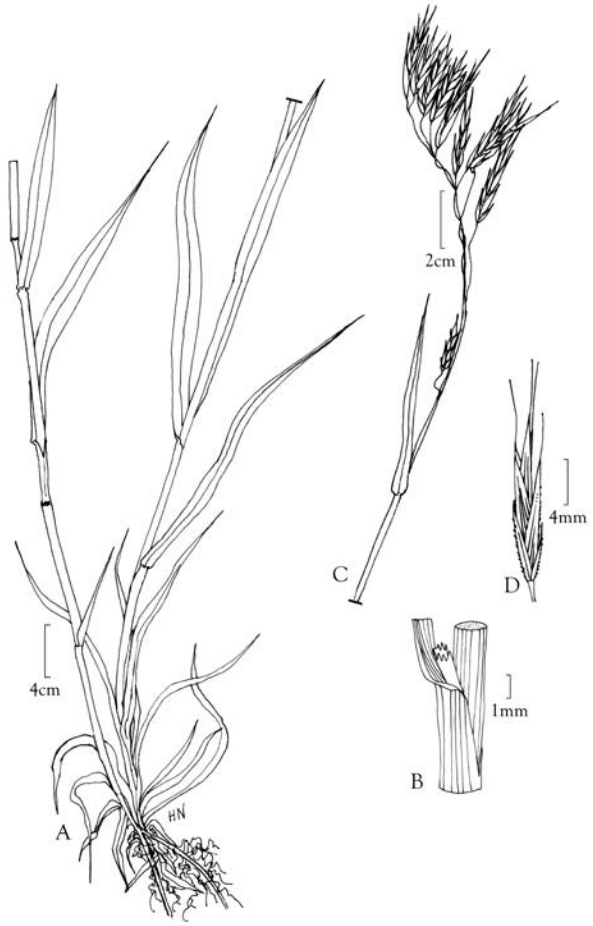

FIGURE 38. *Bromus pubescens* A. Habit. B. Sheath, ligule, and blade. C. Upper portion of culm with panicle. D. Spikelet. A–C drawn from *Kanal 239* (US-32146000); D modified from Barkworth et al. (2007).

sheaths glabrous or nearly so, oral hairs lacking or ciliate; collars hairy or glabrous; ligules 0.5–2 mm long, eciliate membrane, apex erose, truncate or obtuse; blades 12–32 cm long, 5–15(–19) mm wide, linear, flat, surfaces glabrous or hairy adaxially or on both sides, margins glabrous or scabrous, apex acute. Panicles 10–25 cm long, open, oblong, primary panicle branches spreading or drooping. Spikelets (13–)15–30 mm long, oblong, terete to moderately laterally compressed; lower glumes 1-veined; lemmas usually 7-veined; principal lemma awns 3–8 mm long, straight, subapical.

31. *Bromus racemosus** L.

FIGURE 39

Bromus racemosus* L., Sp. Pl. (ed. 2) 1: 114. 1762.
Common names: bald brome, smooth brome, smooth cheat.

Solitary or caespitose annuals. Culms 40–190 cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths retrorsely villous; ligules 2–3.5 mm long, eciliate membranes, apex

FIGURE 39. *Bromus racemosus*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Steele s.n.* (US-557855).

erose; blades 10–60 cm long and 6–15 mm wide, linear, flat, surfaces pilose on both sides, margins pubescent, apex acute. Panicles 15–40 cm long and 1.5–4 cm wide, open, elliptic or oblong, dense, equilateral. Spikelets 20–40 mm long and 3.5–5 mm wide, oblong or lanceolate, terete to moderately laterally compressed; lower glumes (3) 5-veined; lemmas 7 (9)-veined; principal lemma awns 5–10 mm long, straight, subapical.

32. *Bromus secalinus** L.

FIGURE 40

Bromus secalinus* L., Sp. Pl. 1: 76. 1753.
Common names: cheat, chess, rye brome.

Solitary or caespitose annuals. Culms 20–80 cm tall, erect, glabrous. Leaves basal and cauline; lower sheaths puberulent to glabrous; ligules 2–3 mm long, eciliate membranes, apex obtuse; blades 15–30 cm long, 4–10 mm wide, linear, flat, abaxial surface pilose or glabrous, adaxial pilose, margins sparsely hairy, apex acute. Panicles 5–23 cm long, 2.5–12 cm wide; open or contracted, ovate, equilateral or nodding. Spikelets 10–20 mm long, 4–7 mm wide, oblong or ovate, laterally compressed; lower glumes 3–5-veined; lemmas 7-veined; principal lemma awns 0–8 mm long, straight or flexuous, subapical.

33. *Bromus sterilis** L.

FIGURE 41

Bromus sterilis* L., Sp. Pl. 1: 77. 1753.
Common names: barren brome, poverty brome.

Solitary or caespitose annuals. Culms 35–100 cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths hispid; ligules 2–2.5 mm long, eciliate membranes, apex erose; blades 4–20 cm long, 1–6 mm wide, linear, flat, both surfaces pubescent, margins sparsely hairy, apex acute. Panicles 10–20 cm long, 5–2 cm wide, open, ovate, diffuse, nodding; primary panicle branches drooping. Spikelets 20–35 mm long, cuneate, moderately laterally compressed; lower glumes 1 (3)-veined; lemmas 7 (9)-veined; principal lemma awns 15–40 mm long, straight, subapical.

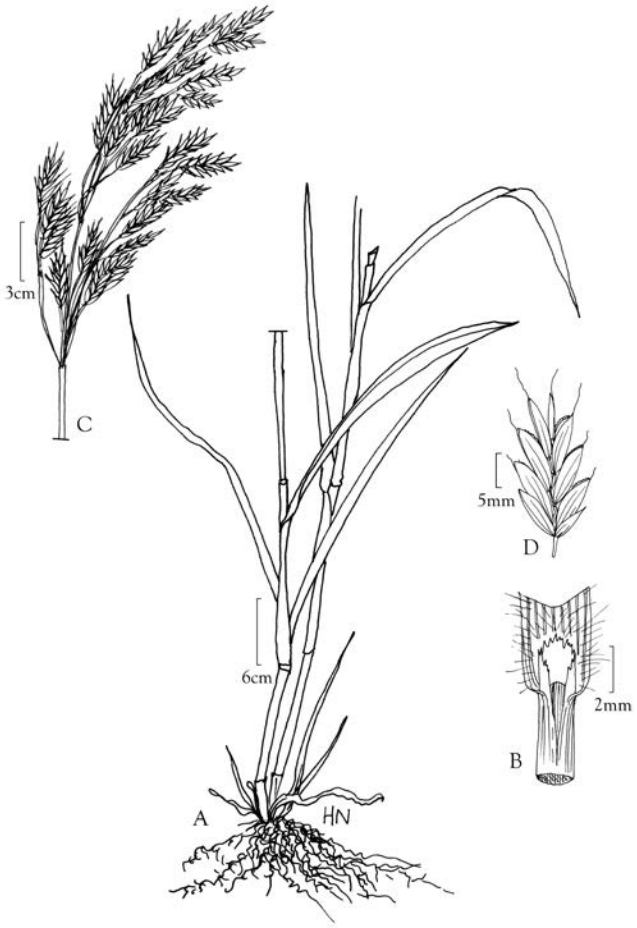

FIGURE 40. *Bromus secalinus*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Balters 735* (US-2238762).

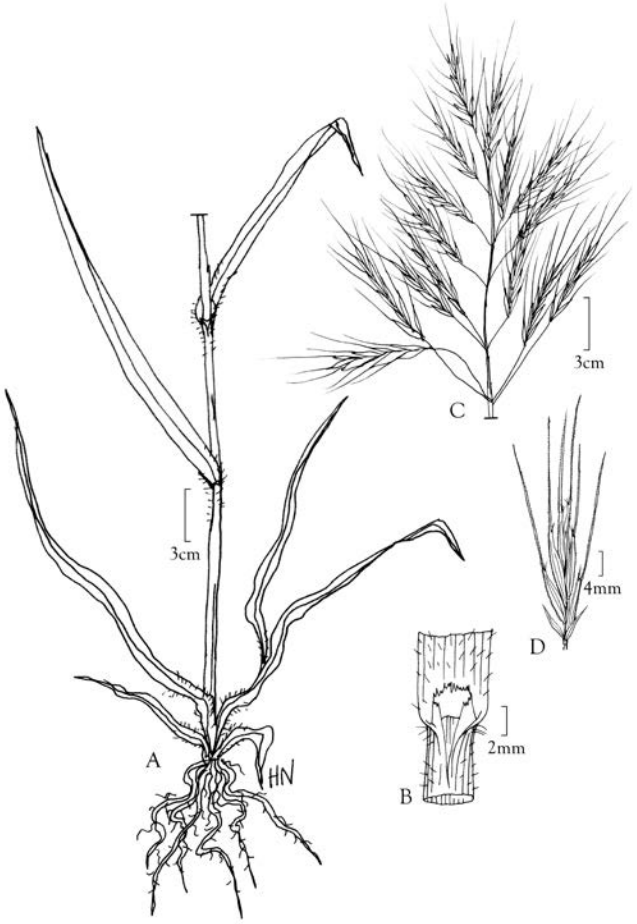

FIGURE 41. *Bromus sterilis*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Kanal 348* (US-3214573).

34. *Bromus tectorum** L.

FIGURE 42

Bromus tectorum* L., Sp. Pl. 1: 77. 1753.
Common names: cheatgrass, downy brome, downy chess, June grass.

Solitary or caespitose annuals. Culms 5–90 cm tall, erect or geniculately ascending. Leaves basal and cauline, sheaths soft-pubescent, upper sheaths sometimes glabrous; ligules 2–3 mm long, eciliate membranes, apex lacerate; blades 2–16 cm long, 1–6 mm wide, linear, flat, both surfaces and margins soft-pubescent, apex acute. Panicles 5–20 cm long, 3–8 mm wide, open or contracted, oblong, interrupted (branches clustered), nodding. Spikelets 10–20 mm long, cuneate, moderately laterally compressed; lower glumes 1-veined; lemmas 5–7-veined; principal lemma awns 10–25 mm long, straight, subapical.

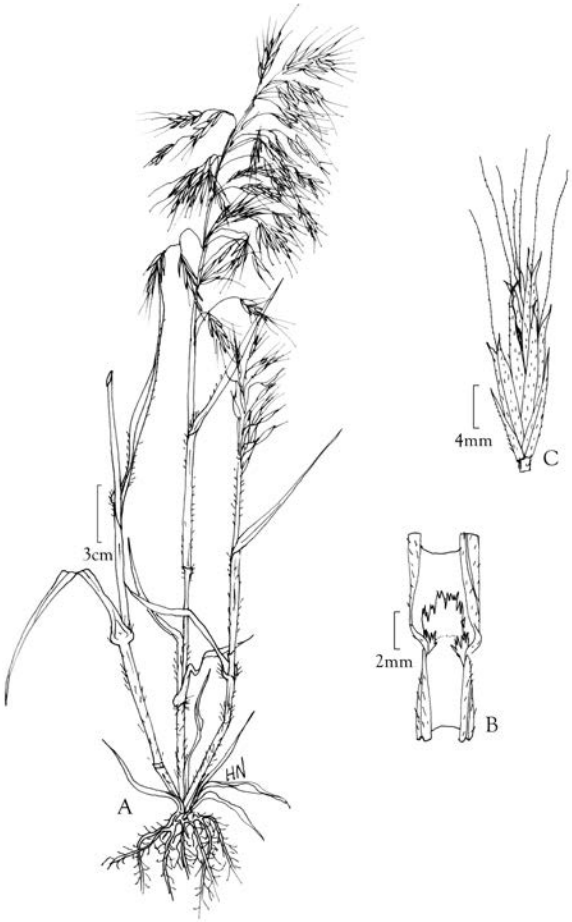

FIGURE 42. *Bromus tectorum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Leonard 21830* (US-2462603); C modified from Barkworth et al. (2007).

35. *Calamagrostis cinnoides* W. P. C. Barton

FIGURE 43

Calamagrostis cinnoides W. P. C. Barton [superfl. for *Arundo canadensis* Michx. = *Calamagrostis canadensis* (Michx.) P. Beauv.; next best name is *Calamagrostis nuttalliana* Steud.].
Common name: small reedgrass.

Loosely caespitose perennials, often glabrous; rhizomes elongated; butt sheaths glabrous. Culms (60–)80–140(–170) cm tall; internodes scabrous; lateral branches lacking. Leaves basal and cauline; sheaths smooth, antrorsely scabrous or glabrous; ligules (2–)3–4(–6) mm long, eciliate membranes, apex usually truncate, rarely obtuse, sometimes lacerate, collars glabrous to densely scabrous; blades (8–)10–35(–45) cm long, (3–)3.5–7.5 (–10) mm wide, flat or involute, linear, surfaces scabrous, margins pubescent, apex acute. Panicles (8–)12–20(–25) cm long, 1–3 cm wide, contracted to open, lanceolate or ovate, dense or loose.

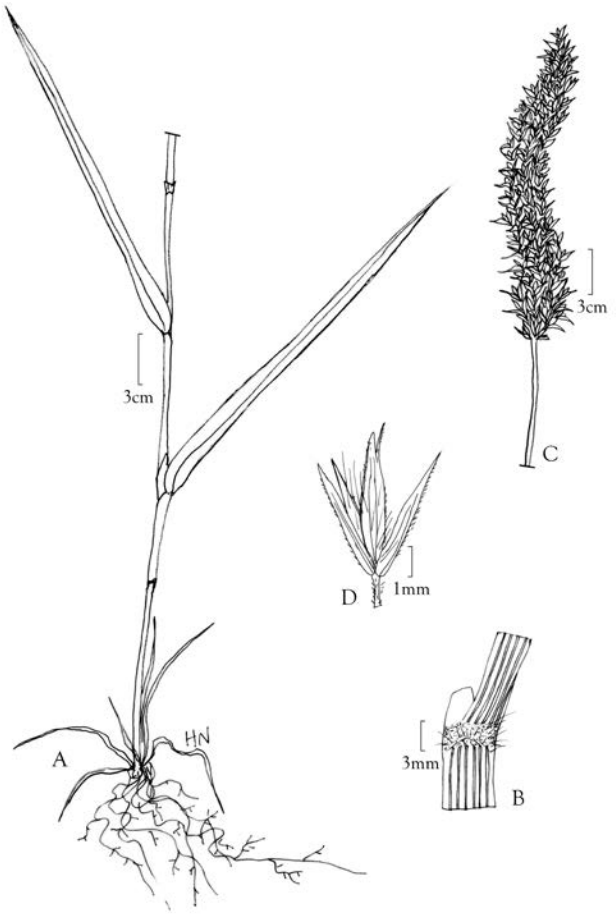

FIGURE 43. *Calamagrostis cinnoides*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Lehtonen & Young 62* (US-2858576); D modified from Barkworth et al. (2007).

Spikelets 5–7 (7.5) mm long, lanceolate, laterally compressed, 1-flowered; florets with a rachilla extension 1 mm long; principal lemma awns 2–5 mm long, dorsal, straight, arising on upper 2/5 of lemma.

36. *Cenchrus longispinus* (Hack.) Fernald

FIGURE 44

Cenchrus longispinus (Hack.) Fernald, Rhodora 45(538): 388. 1943.

Common names: longspine sandbur, mat sandbur.

Caespitose annuals. Culms 20–90 cm long, geniculately ascending or decumbent; branches arising from the base. Leaves basal and cauline; sheaths strongly compressed-keeled, outer margin hairy, oral hairs ciliate; ligules 0.6–1.8 mm long, fringe of hairs; blades 4–27 cm long, 1.5–5(–7.5) mm wide, linear, flat, surfaces glabrous, scabrous, pilose or sparsely hairy, margins scabrous, apex acute. Panicles 1.5–8(–10) cm long, 1.2–2.2 cm wide, spiciform, linear, dense; fascicles (burs) 8.3–11.9 mm long, 3.5–6 mm wide, somewhat globose, composed of bristles that are fused into a cup, bristles 3.5–7 mm long. Spikelets 6–7.8 mm long, fertile spikelets sessile, 2–3 per fascicle, ovate, dorsally compressed, acuminate; lemmas awnless.

37. *Chasmanthium latifolium* (Michx.) H. O. Yates

FIGURE 45

Chasmanthium latifolium (Michx.) H. O. Yates, Southw. Naturalist 11(4): 416. 1966.

Common names: broadleaf chasmanthium, Indian wood-oats, wild oats.

Caespitose perennials; rhizomes short, knotty. Culms 100–150 cm tall, rarely branched. Leaves basal and cauline; ligules

FIGURE 44. *Cenchrus longispinus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Babock s.n.* (US-787176); C modified from Barkworth et al. (2003).

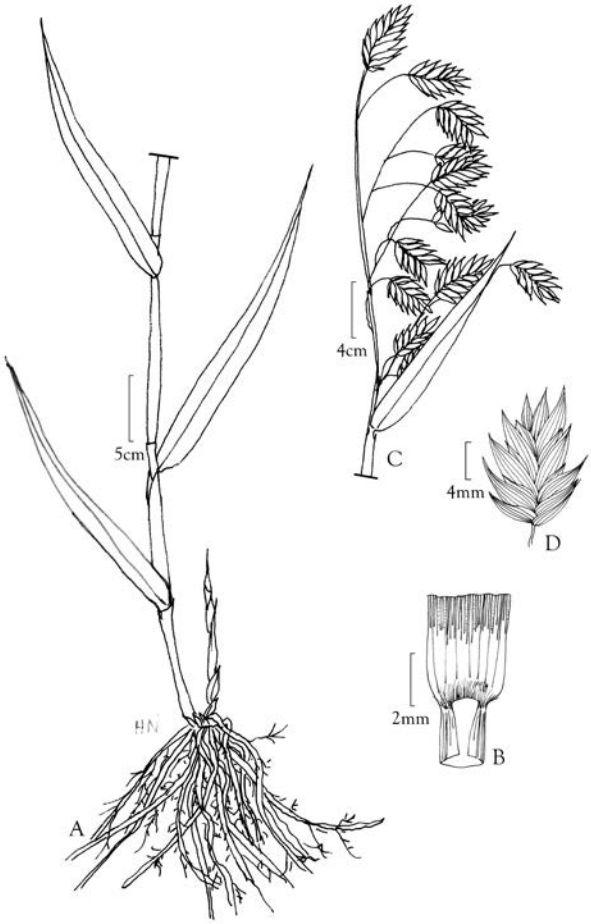

FIGURE 45. *Chasmanthium latifolium*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Hitchcock 15641* (US-3150886); D modified from Barkworth et al. (2003).

0.7–1 mm long, ciliolate membranes; sheaths glabrous; collars glabrous, blades (7–)9–18 (–22) cm long, (4–)10–22 mm wide, lanceolate, flat, venation with distinct cross veins, surfaces glabrous, margins scabrous, apex acute. Panicles (8–)10–25(–35) cm long, open, ovate, primary panicle branches drooping. Spikelets 20–40 mm long, 6–16 mm wide, 6–20(–26)-flowered, pendulous, elliptic or ovate, laterally compressed; lemmas 11–15-veined, awnless.

38. *Chasmanthium laxum* (L.) H. O. Yates

FIGURE 46

Chasmanthium laxum (L.) H. O. Yates, Southw. Naturalist 11(4): 433. 1966.
Common names: slender chasmanthium, slender wood-oats.

Caespitose perennials; rhizomes short, knotty. Culms 40–130 cm tall. Leaves basal and cauline; sheaths glabrous pubescent or hirsute; collars glabrous; ligule 0.2–0.4 mm long, a ciliolate membrane; blades (8–)15–35(–40) cm long, 3–8(–11) mm wide, linear-lanceolate, flat, surface glabrous or sparsely hairy, margin sparsely hairy, apex acute. Panicle (7–)12–35(–47) cm long, contracted, glomerate, linear, interrupted. Spikelets 4–9 mm long, 2–6 mm wide, 3–5(–7)-flowered, cuneate, laterally compressed; lemmas 3–7-veined, awnless.

39. *Cinna arundinacea* L.

FIGURE 47

Cinna arundinacea L., Sp. Pl. 1: 5. 1753.
Common names: common woodreed, Indian reed, stout woodreed, sweet woodreed.

Solitary perennials. Culms 28–185 cm tall, erect; somewhat bulbous at base. Leaves basal and cauline; sheaths glabrous; collars glabrous; ligules 2–10 mm long, eciliate membranes, apex lacerate; blades 15–35 cm long, 3–19 mm wide, linear, flat,

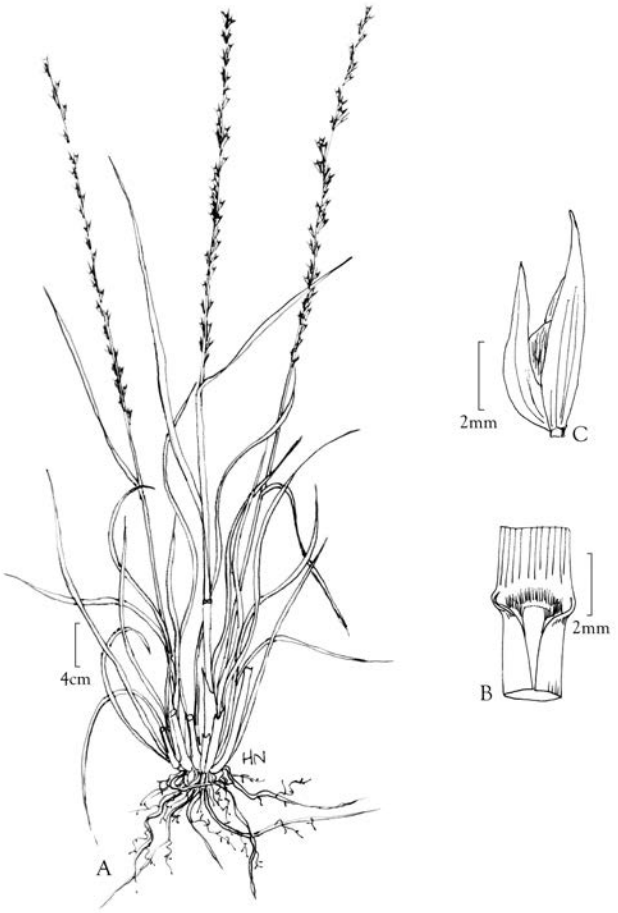

FIGURE 46. *Chasmanthium laxum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Steele s.n.* (US-279381); C modified from Barkworth et al. (2003).

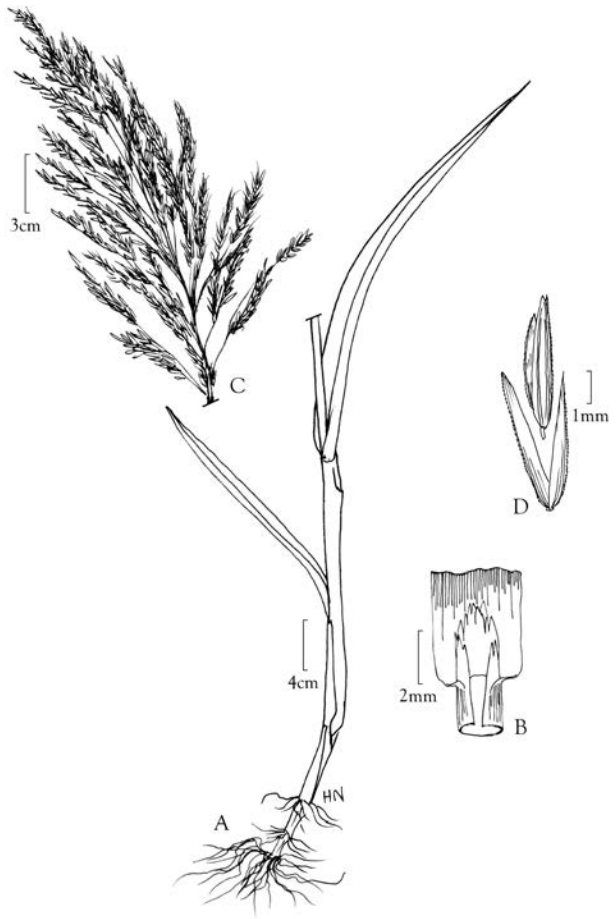

FIGURE 47. *Cinna arundinacea*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 643* (US-3075152); D modified from Hitchcock (1951).

surfaces and margins scabrous, apex acuminate. Panicles 6.5–55 cm long, ascending, open to somewhat contracted, elliptic, dense, nodding. Spikelets (3.5–)4–6(–7.5) mm long, elliptic, laterally compressed; lemmas 3 (5)-veined; principal lemma awns 0.5–1.5 mm long, subapical.

40. *Coleataenia anceps* (Michx.) Soreng

FIGURE 48

Coleataenia anceps (Michx.) Soreng, J. Bot. Res. Inst. Texas 4(2): 691. 2010. [Syn. *Panicum anceps* Michx.]
Common names: flat-stemmed panic grass, beaked panic grass.

Caespitose perennials, rhizomes short or elongated, stout, scaly rootstocks; butt sheaths glabrous or pilose; basal innovations flabellate. Culms 30–130 cm long, terete to slightly compressed, nodes pallid or purple. Leaves mostly basal; sheaths laterally compressed, glabrous to pilose; ligules 0.2–0.5 mm long, eciliate membranes, apex erose, often brownish; collars glabrous or pilose; blades 10–50 cm long, 4–8 mm wide, erect, linear, flat or conduplicate, adaxial surface pilose at least basally, glabrous or pilose abaxially, margins scabrous, apex acute. Panicles 10–40 cm long, open or contracted, ovate; secondary branches tightly appressed. Spikelets 2.3–3.9 mm long, ovate, tilted on the pedicel, dorsally compressed; lemmas awnless.

41. *Coleataenia rigidula* (Bosc. ex Nees) LeBlond

FIGURE 49

Coleataenia rigidula (Bosc. ex Nees) LeBlond, J. Bot. Res. Inst. Texas 5(2): 448. 2011. [Syn. *Panicum rigidulum* Bosc. ex Nees.]
Common name: red-top panic grass.

Densely caespitose perennials; rootstock evident; butt sheaths pubescent. Culms 35–150 cm long, decumbent, wiry. Leaves

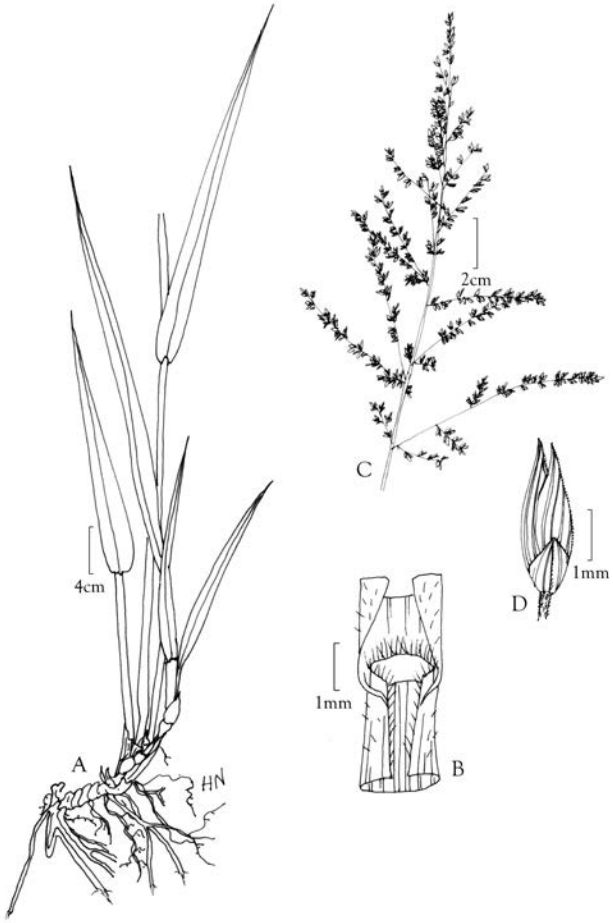

FIGURE 48. *Coleataenia anceps*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 185* (US-3142653); D modified from Barkworth et al. (2003).

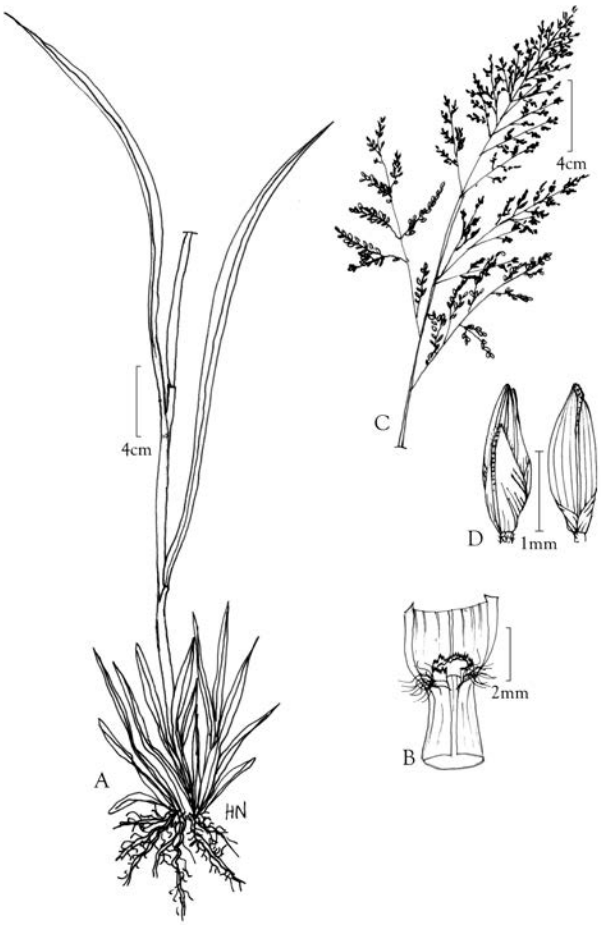

FIGURE 49. *Coleataenia rigidula*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Swallen 105* (US-2476688); D modified from Barkworth et al. (2003).

distichous; sheath strongly compressed or keeled, glabrous or sparsely pubescent; ligules 0.3–3 mm, eciliate membranes, apex erose or ciliate; blades 8–50 cm long and 2–12 mm wide, involute, stiff, linear, flat or folded, both surfaces usually glabrous or scaberulous, margins tuberculate; apex acute; pungent. Panicles 9–40 cm long, 2–12 cm wide, open, ovate, spikelets clustered toward branch tips. Spikelets 1.6–3.8 mm long, in pairs, elliptic, dorsally compressed, acute; lemmas awnless.

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

FIGURE 50

Cynodon dactylon* (L.) Pers., Syn. Pl. 1: 85. 1805.
Common names: Bermuda grass, scutch grass.

Mat-forming perennials; rhizomes elongated; stolons present. Culms 5–40(–50) cm long, geniculately ascending. Leaves basal and cauline; sheaths glabrous with scattered hairs; collars usually with long hairs, particularly at margins; ligules 0.2–0.3 mm long, ciliolate membranes; blades 1–6(–16) cm long, (1–)2–4(–5) mm wide, linear, flat or conduplicate, glaucous, surfaces scaberulous, glabrous or pilose, sparsely hairy, margins glabrous, apex acute. Panicles 1.5–6(–8) cm long, with 4–6 digitately arranged unilateral branches; spikelet packing broadside to rachis, regular, 2-rowed. Spikelets 2–3.2 mm long, ovate, strongly laterally compressed; lemmas awnless.

43. *Dactylis glomerata** L.

FIGURE 51

Dactylis glomerata* L., Sp. Pl. 1: 71. 1753.
Common name: orchard grass.

Caespitose perennials; basal innovations flabellate. Culms 15–140 cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths, longer than internodes; usually keeled, glabrous; ligules 3–11 mm long, eciliate membranes, apex truncate to acuminate; blades 10–45 cm long, (2–)4–8(–10) mm wide, linear, lax,

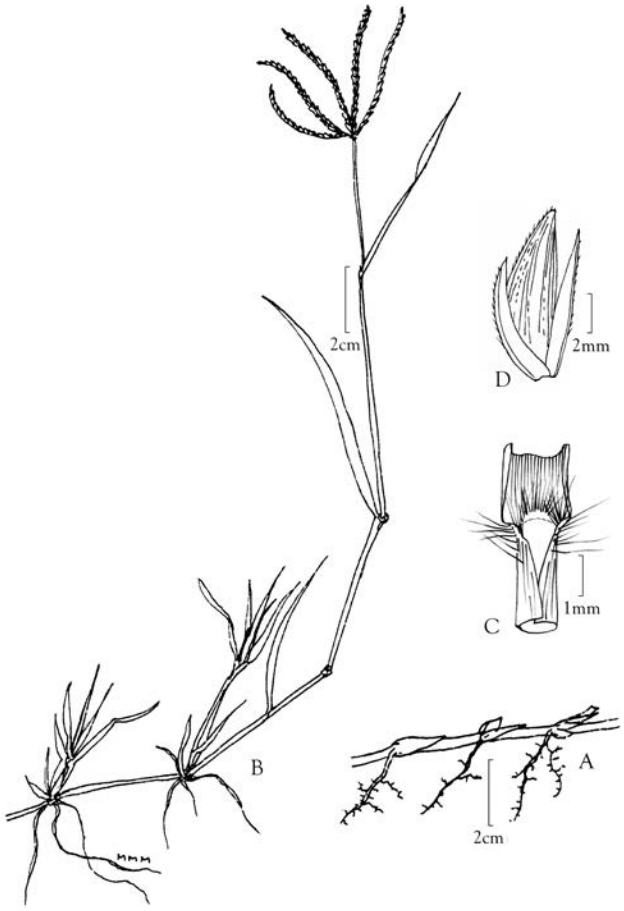

FIGURE 50. *Cynodon dactylon*. A. Rhizome. B. Habit. C. Sheath, ligule, and blade. D. Spikelet. A–C drawn from *Kanal 432* (US-3279031); D modified from Hitchcock (1951).

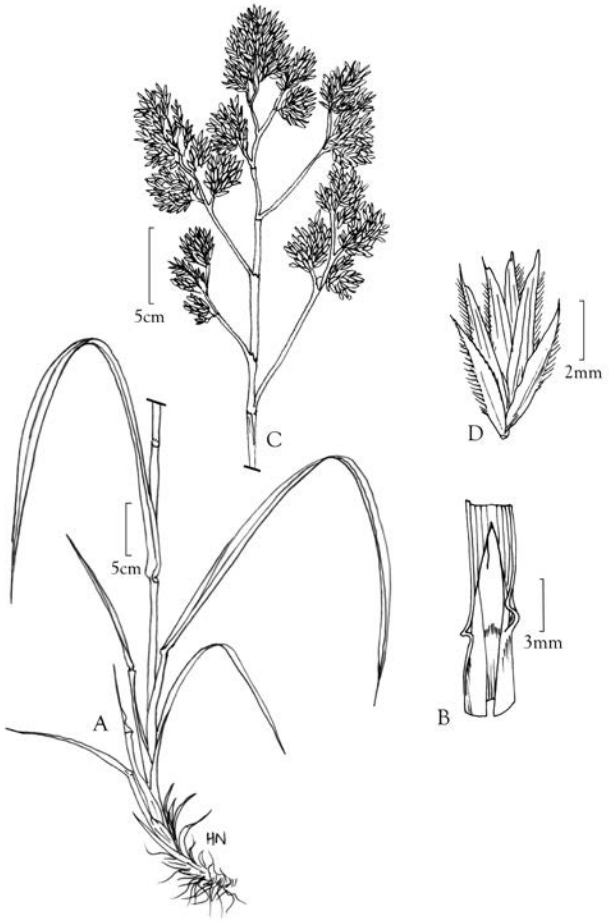

FIGURE 51. *Dactylis glomerata*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 546* (US-3208293); D modified from Hitchcock (1951).

conduplicate, surfaces glabrous, with conspicuous midrib, margins white scaberulous to scabrous, apex acute. Panicles 2–30 cm long, ovate, interrupted, secund, gathered into fascicles, lower branches spreading. Spikelets 5–8 mm long, oblong or cuneate, strongly laterally compressed; principal lemma awns 0.5–1.5 mm long, straight.

44. *Danthonia compressa* Austin

FIGURE 52

Danthonia compressa Austin, Annual Rep. New York State Mus. Nat. Hist. 22(87): 55. 1869.

Common names: Alleghany flyback, flattened poverty grass, flattened wild oatgrass, mountain oatgrass.

Caespitose perennials; rhizomes absent or short; butt sheaths scarious, fibrous. Culms 40–80 cm tall, geniculately ascending or decumbent, scabrous, glaucous, disarticulating at the nodes. Leaves mostly basal; sheaths compressed, glabrous, rarely sparsely pilose; oral hairs bearded; ligules fringe of hairs; collars glabrous or pubescent; blades 10–30 cm long, 2–4 mm wide, filiform, involute, flexible but not curled surfaces and margins glabrous, sometimes scabrous, apex acute. Panicles (4–)6–17 cm long, open, ascending, somewhat contracted, lanceolate. Spikelets (7–)10–16 mm long, elliptic, terete or laterally compressed; principal lemma awns 6–10 mm long, from a sinus, geniculate, twisted below.

45. *Danthonia spicata* (L.) P. Beauv. ex Roem. & Schult.

FIGURE 53

Danthonia spicata (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 690. 1817.

Common names: poverty grass, poverty oatgrass, poverty wild oatgrass.

Caespitose perennials. Culms (7–)10–70(–100) cm tall, erect, disarticulating at the nodes when mature; nodes glabrous. Leaves mostly basal; sheaths glabrous rarely sparsely pilose, with simple

FIGURE 52. *Danthonia compressa*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Kearney s.n.* (US-83892); D modified from Hitchcock (1951).

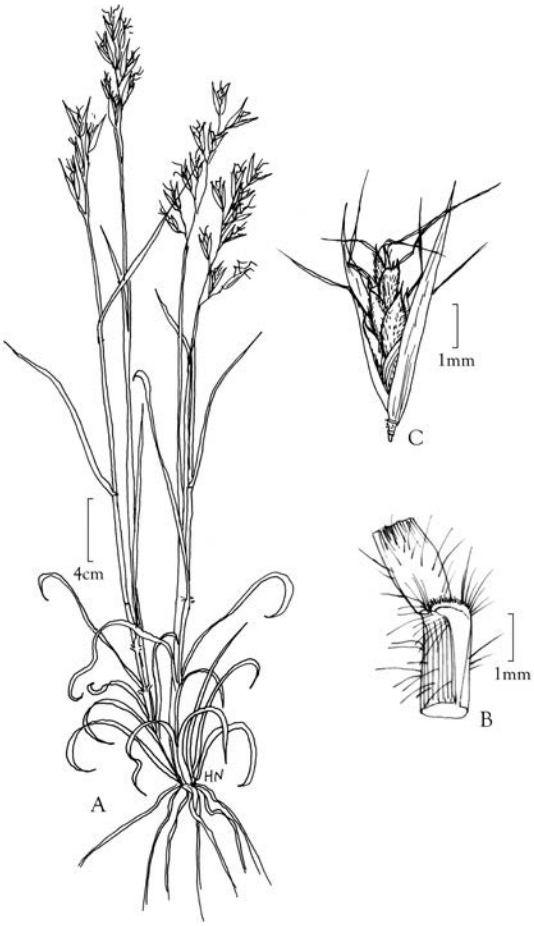

FIGURE 53. *Danthonia spicata*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 012* (US-3073414); C modified from Hitchcock (1951).

or tubercle-based hairs, oral hairs ciliate; ligule less than 1.5 mm long, a fringe of hairs; blades 6–15(–20) cm long, 0.8–3(–4) mm wide, curled or flexuous, flat or involute, surfaces glabrous, rarely scabrous and margins glabrous, apex acute. Panicles 5–10(–18) cm long, contracted, linear, bearing few spikelets. Spikelets 10–15 mm long, cuneate, terete or laterally compressed; principal lemma awns 5–8 mm long, from a sinus, geniculate, twisted below.

46. *Dichanthelium aciculare* (Desv. ex Poir.) Gould & C. A. Clark

FIGURE 54

Dichanthelium aciculare (Desv. ex Poir.) Gould & C. A. Clark, Ann. Missouri Bot. Gard. 65(4): 1116. 1979.
Common names: narrow-leaf panic grass, needle-leaf rosette grass.

Caespitose perennials; butt sheaths villous with white hairs. Culms 15–75 cm tall; internodes distally glabrous to pilose; nodes glabrous or pubescent; lateral branches sparse; fall phase with erect to spreading culms, extensively branching from middle and upper nodes, producing flabellate clusters of reduced involute or flat blades. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths glabrous or with soft, ascending papillose-based hairs, outer margins glabrous or hairy, oral hairs lacking or ciliate; ligules 0.5–2 mm long, fringe of hairs or absent; blades 4–16 cm long, 3–9 mm wide, stiffly ascending, lanceolate, flat, tapering toward tip, wider in winter rosette, surfaces glabrous to pilose, margins glabrous or slightly ciliate, hairy at bases, with prominent raised veins, apex attenuate. Panicles 2–10 cm long, 0.5–7 cm wide, open, ovate, bearing few spikelets. Spikelets 1.7–3.6 mm long, 1.2–1.8 mm wide, elliptic or obovate, obtuse, dorsally compressed; lemma awnless.

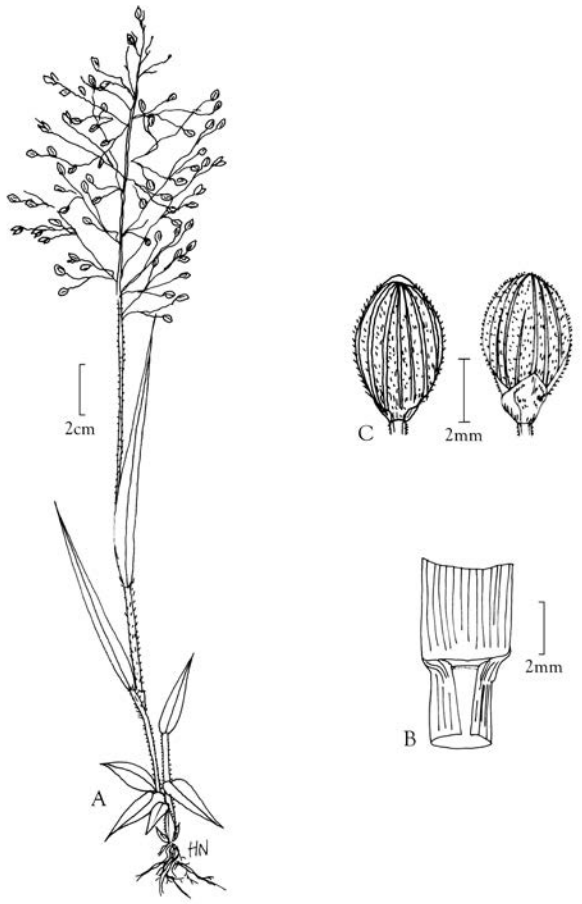

FIGURE 54. *Dichanthelium aciculare*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Steele s.n.* (US-363942); C modified from Hitchcock (1951).

47. *Dichanthelium acuminatum* (Sw.) Gould & C. A. Clark

FIGURE 55

Dichanthelium acuminatum (Sw.) Gould & C. A. Clark, Ann. Missouri Bot. Gard. 65(4): 1121. 1979.
Common names: hairy panic grass, tapered rosette grass.

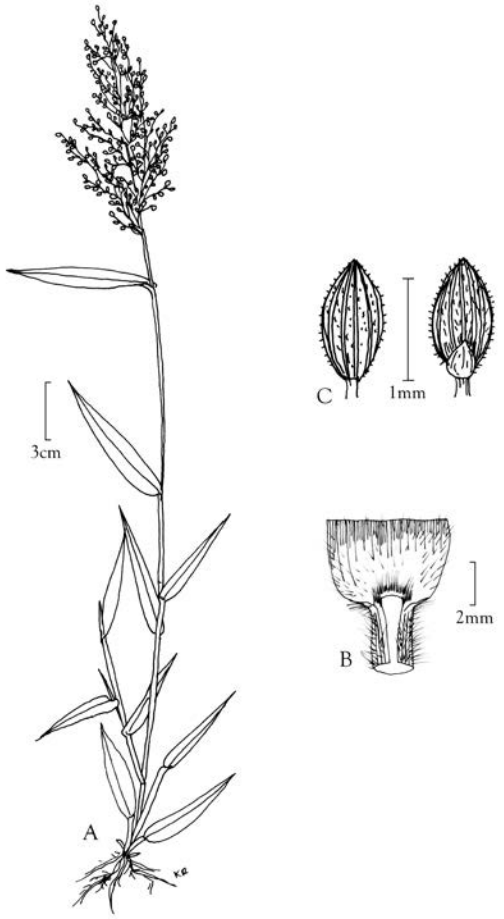

FIGURE 55. *Dichanthelium acuminatum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Kanal 016* (DC-3075122); C modified from Hitchcock (1951).

Caespitose perennials; butt sheaths villous with white hairs. Culms 15–100 cm tall, erect, ascending or decumbent, weak; internodes distally pubescent; nodes bearded; lateral branches sparse or ample, arising from lower culms; fall phase erect, spreading or decumbent, usually with ample branching at all except the uppermost nodes, forming dense fascicles of branches with reduced, flat or involute blade. Leaves cauline, heterophyllous with a basal winter rosette; sheaths glabrous on surface or pilose, with tubercle-based hairs; ligules 1–5 mm long, fringe of hairs; blades 2–12 cm long, 2–12 mm wide, linear-lanceolate, flat, surfaces pubescent, hairy abaxially, margins tuberculate-ciliate, bases rounded or subcordate, apex acute. Panicles 3–12 cm long, 2–9 cm wide, open, oblong, bearing a few spikelets. Spikelets 1.1–2.1 mm long, elliptic or oblong or obovate, dorsally compressed, acute; lemmas awnless.

48. *Dichanthelium annulum* (Ashe) LeBlond

FIGURE 56

Dichanthelium annulum (Ashe) LeBlond, Sida 19(4): 826. 2001.
Common names: annulus panic grass, ringed panic grass.

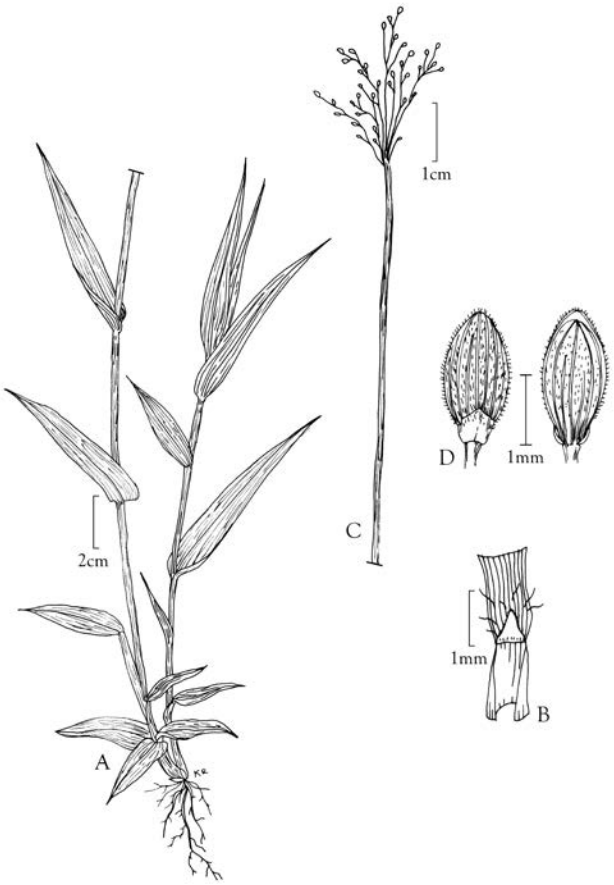

FIGURE 56. *Dichanthelium annulum*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Spikelets. A–C drawn from *Hitchcock 9232* (US-733473); D modified from Hitchcock (1951).

Caespitose or solitary perennials, vernal phase usually purplish. Culms 35–60(–90) cm tall, erect or decumbent, densely bearded; fall phase branching from mid-culm nodes, branches nearly erect; autumnal phase suberect, bearing in late autumn a few short erect branches at the upper nodes. Leaves cauline; sheaths velvety pubescent or the upper nearly glabrous, tubular, closed most of its length, oral hairs ciliate; ligules fringe of hairs; blades 4.5–12 cm long, 3–10 mm wide (3–6 times longer than wide), lanceolate, spreading, flat, both surfaces hairy, margins hairy, apex acute. Panicles 4–9 cm long, open, oblong. Spikelets (1.5–)1.8–2.1 mm long, solitary, oblong or obovate, dorsally compressed; lemmas awnless.

49. *Dichanthelium boscii* (Poir.) Gould & C. A. Clark

FIGURE 57

Dichanthelium boscii (Poir.) Gould & C. A. Clark, Ann. Missouri Bot. Gard. 65(4): 1101. 1979.
Common names: Bosc's panic grass, Bosc's rosette grass.

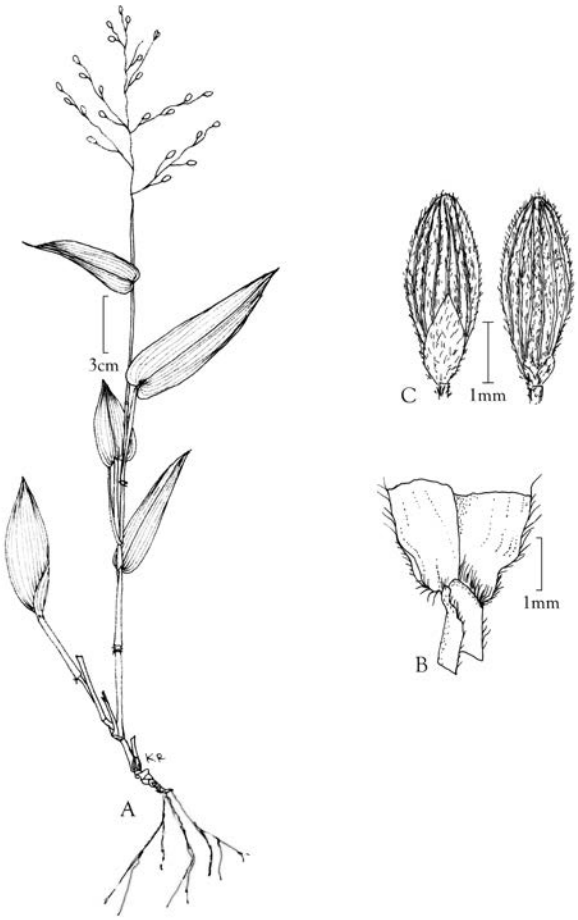

FIGURE 57. *Dichanthelium boscii*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Fleming 1286* (US-3230457); C modified from Barkworth et al. (2003).

Caespitose perennials. Culms 25–75 cm tall from knotted crown, initially erect, often sprawling in the fall; internodes distally glabrous or pubescent; nodes bearded; fall phase branching from mid-culm nodes, branches nearly erect, sparsely rebranching; lateral branches ample, arising from mid-culm. Leaves basal and cauline heterophyllous with a basal winter rosette; sheath surface glabrous to downy-pilose; ligules 0.4–0.9 mm long, ciliate membranes; blades 3–6 times longer than wide, 15–40 mm wide, spreading, flat, orate-lanceolate, surfaces glabrous to puberulent, margins tuberculate-ciliate, hairy at base, bases cordate, apex acute. Panicles 6–12 cm long, 4–12 cm wide, open, ovate. Spikelets 3.8–5.2 mm long, 1.7–2.2 mm wide, elliptic, dorsally compressed; lemmas awnless.

50. *Dichanthelium clandestinum* (L.) Gould

FIGURE 58

Dichanthelium clandestinum (L.) Gould, Brittonia 26(1): 59. 1974.
Common names: deer-tongue grass, deer-tongue rosette grass.

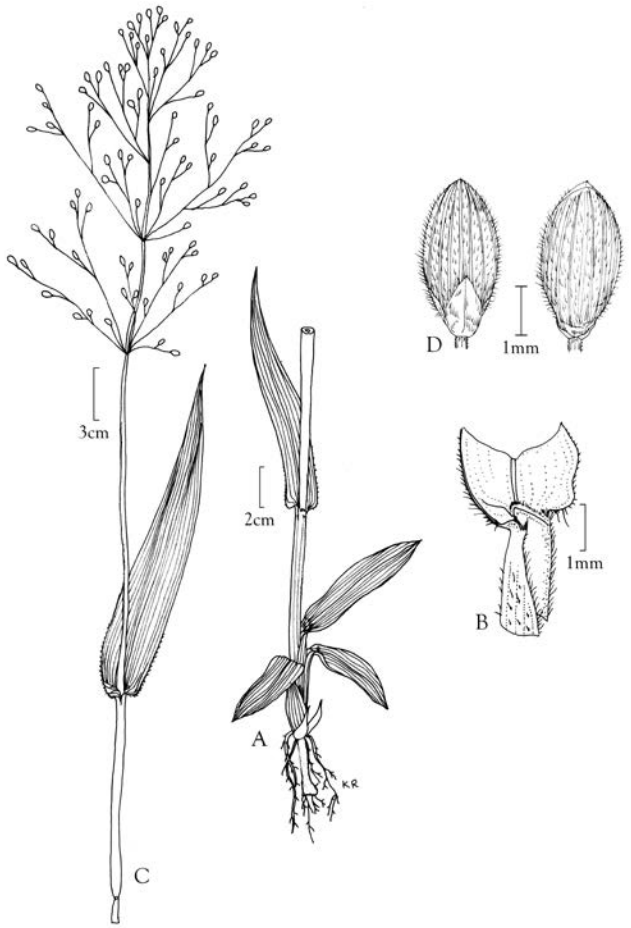

FIGURE 58. *Dichanthelium clandestinum*. A. Base of culm. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Spikelets. A–C drawn from *Leonard 10250* (US-1769828); D modified from Hitchcock (1951).

Caespitose perennials; rhizomes thick, short. Culms 50–140 cm tall; internodes antrorsely scabrous, scabrous to papillose-hispid below the nodes; nodes glabrous or pubescent; lateral branches fastigiated; fall phase branching from the middle and upper nodes, with a few elongate, erect branches, sparsely rebranching. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths hispid, with tubercle-based hairs; ligules 0.4–0.9 mm long, fringe of hairs; collars pubescent; blade bases cordate; blades 10–25 cm long, 15–30 mm wide, spreading or reflexed, lanceolate, flat, surfaces scabrous, rough on both sides, glabrous, margins ciliate, hairy at base, apex acuminate. Panicles 9–16 cm long, 4–12 mm wide, terminal and axillary, open, elliptic. Spikelets 4–4.5 mm long, 1.2–1.5 mm wide, elliptic, dorsally compressed; lemmas awnless.

51. *Dichanthelium columbianum* (Scribn.) Freckmann

FIGURE 59

Dichanthelium columbianum (Scribn.) Freckmann, Phytologia 39(4): 270. 1978.
Common name: American witch grass.

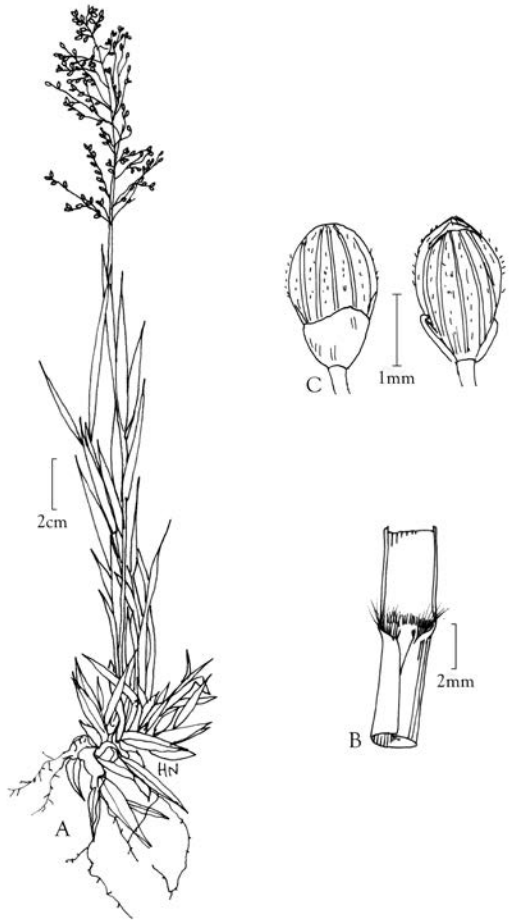

FIGURE 59. *Dichanthelium columbianum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Leonard 21597* (US-2344680); C modified from Hitchcock (1951).

Caespitose perennials; rhizomes short butt sheaths pubescent. Culms 15–50 cm tall, without nodal roots or rooting from lower nodes; internodes distally hirsute; nodes black, glabrous or pubescent; lateral branches ample, arising from lower culm and upper culm. Leaves cauline, heterophyllous, narrow on older culms; sheaths eglandular or glandular, glabrous on surface to hirsute, outer margin hairy; ligules less than 0.5 mm long, ciliate membranes; blades 2–6(–7) cm long, 2–8 mm wide, flat, stiff or firm, surface glabrous adaxially, glabrous to puberulent abaxially, margins scabrous, ciliate, hairy at base, bases amplexicaul; apex acuminate. Panicles 2.5–6 cm long, about as wide as long, open, terminal and axillary, ovate, diffuse. Spikelets 1.5–2.6 mm long, obovate, asymmetrical, dorsally compressed; lemmas awnless.

52. *Dichanthelium commutatum* (Schult.) Gould

FIGURE 60

Dichanthelium commutatum (Schult.) Gould, Brittonia 26(1): 59. 1974.

Common names: variable panic grass, variable rosette grass.

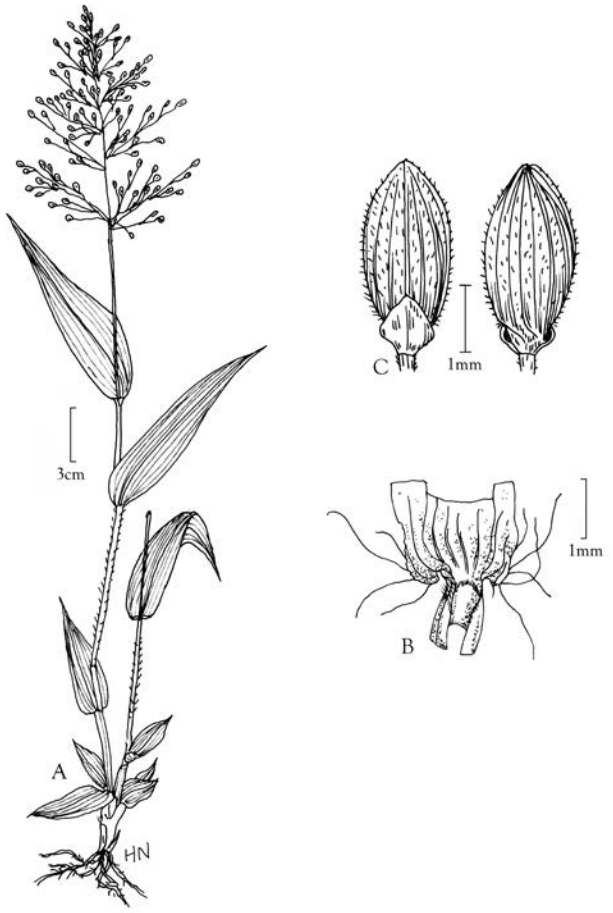

FIGURE 60. *Dichanthelium commutatum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Allard 20578* (US-2180105); C modified from Hitchcock (1951).

Caespitose perennials; with caudices or with rhizomes, rootstock evident. Culms 20–75 cm tall, erect or geniculately ascending; internodes distally glabrous or rarely softly puberulent; nodes glabrous to puberulent, often purplish; lateral branches clustered, arising from mid-culm; fall phase initially erect, dichotomous, rebranching. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths glabrous, often glaucous, outer margins hairy; ligules 0.1–0.5 mm long, fringe of hairs or absent; blades 5–16 cm long, 5–25 mm wide, lanceolate, spreading or reflexed, flaccid, surfaces scabrous, margins ciliate, hairy and symmetrically cordate clasping at base, apex acute. Panicles 5–12 cm long, 3–10 cm wide, terminal and axillary, open, ovate. Spikelets 2.2–3.2 mm long, 1.1–1.3 mm wide, elliptic, with obtuse base, dorsally compressed, subacute; lemmas awnless.

53. *Dichanthelium depauperatum* (Muhl.) Gould

FIGURE 61

Dichanthelium depauperatum (Muhl.) Gould, Brittonia 26(1): 59. 1974.

Common names: starved panic grass, starved rosette grass.

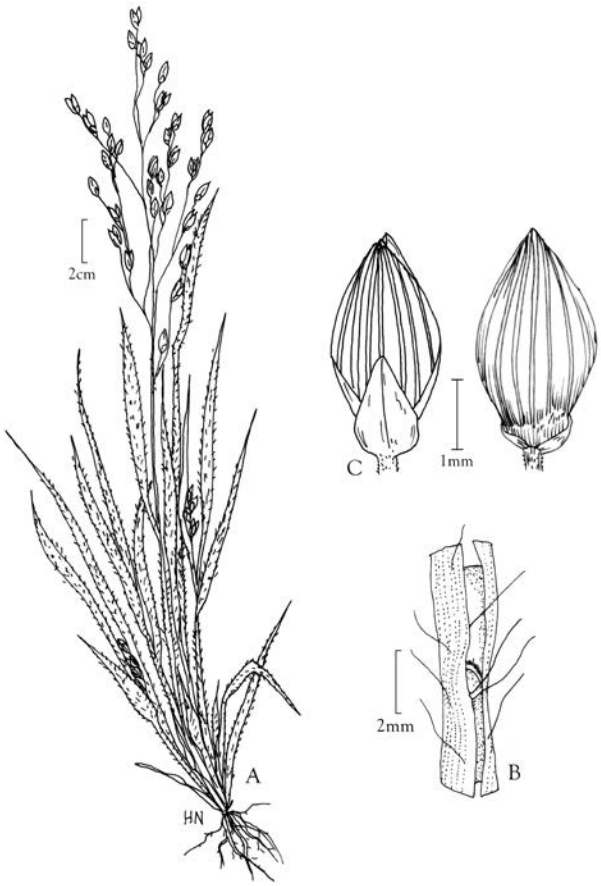

FIGURE 61. *Dichanthelium depauperatum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Leonard 21564* (US-2382921); C modified from Hitchcock (1951).

Caespitose perennials. Culms 10–45 cm tall; internodes distally glabrous or pubescent; lateral branches sparse; nodes bearded; fall phase a mass of erect blades and short branches arising from the basal culm nodes. Leaves basal and cauline; sheaths pubescent, longer than internodes; ligules 0.3–1 mm long, fringe of hairs; blades 6–15 cm long, 1–4 mm wide, linear or lanceolate, flat or involute, surfaces glabrous or pilose or hispid, hairy abaxially, margins pubescent, apex attenuate. Panicles 3–6 cm long, 1.5–3 cm wide, open, elliptic, bearing few spikelets. Spikelets 3.2–4.3 mm long, 1–1.7 mm wide, ovate, with obtuse base, dorsally compressed, acute; lemmas awnless.

54. *Dichanthelium dichotomum* (L.) Gould

FIGURE 62

Dichanthelium dichotomum (L.) Gould, Brittonia 26(1): 59. 1974.
Common names: bushy panic grass, cypress rosette grass.

Caespitose perennials; rootstocks evident. Culms 20–60 (–100) cm tall, slender, often purplish; nodes glabrous or bearded; lateral branches clustered; fall phase ample branches from mid-culm nodes, forming dense clusters of reduced flat to involute blades. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths longer than internodes, usually glabrous or densely ascending, pilose, outer margins hairy; ligules 0.2–1 mm long, a fringe of hairs; blades 3.5–9 cm long, 5–7(–13) mm wide, linear, flat, sometimes involute, surfaces glabrous or pilose, margins glabrous or ciliate, hairy at base, apex attenuate. Panicle 3–8(–10) cm long, open, oblong. Spikelets 1.8–2.3 mm long, 0.6–1.1 mm wide, oblong or obovate, dorsally compressed; lemmas awnless.

55. *Dichanthelium ensifolium* (Baldwin ex Elliott) Gould

FIGURE 63

Dichanthelium ensifolium (Baldwin ex Elliott) Gould, Brittonia 26(1): 59. 1974.
Common name: sword-leaf panic grass.

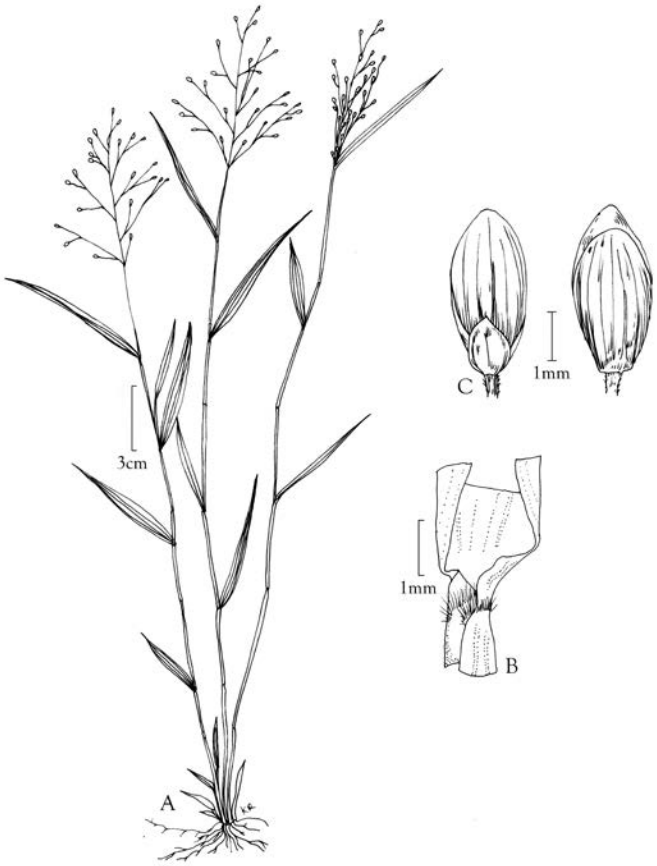

FIGURE 62. *Dichanthelium dichotomum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Donald 113* (US-3557139); C modified from Hitchcock (1951).

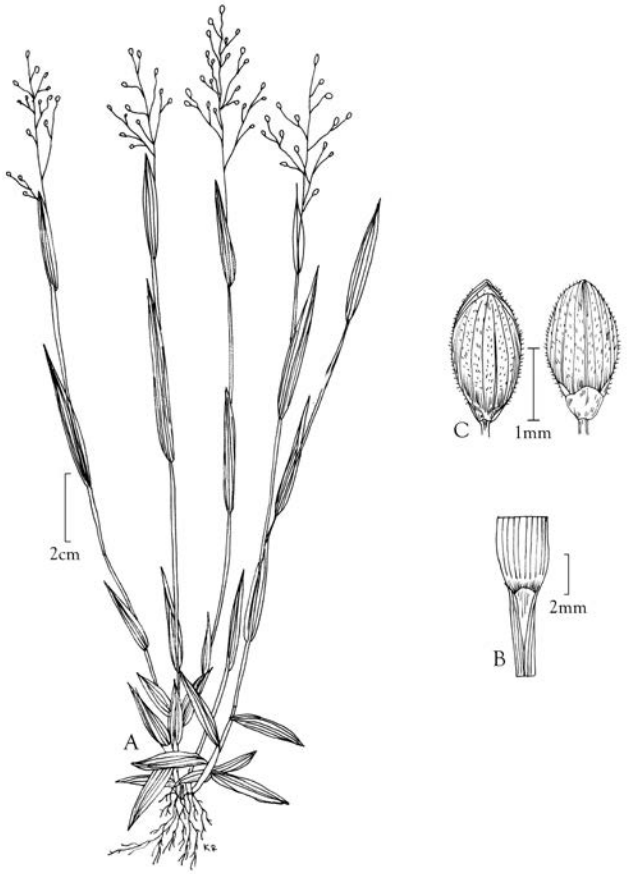

FIGURE 63. *Dichanthelium ensifolium*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Killip 7113* (US-984197); C modified from Hitchcock (1951).

Caespitose perennials, with caudices. Culms 10–40 cm tall, weak, erect or reclining; nodes usually glabrous, sometimes sparsely bearded; internodes usually glabrous, occasionally sparsely pubescent; fall phase with spreading culms, sparsely branched mostly from mid-culm nodes, occasionally producing small fascicles of leafy branchlets. Leaves basal and cauline; sheaths prominently veined, glabrous or sparsely pilose and ciliate, particularly at the top; ligules 0.2–1.8 mm long, ciliate; blades 1.5–3.5 cm long, 1.5–4 mm wide, lanceolate to ovate, flat, spreading or reflexed, abaxial surfaces glabrous or sparsely pilose, at least basally, bases abruptly and strongly constricted, margins entire or fairly scaberulous, apex acute. Panicles 1.5–4 cm long, nearly as wide as long, open. Spikelets 1.2–1.5 mm long, 0.7–0.9 mm wide, elliptic, dorsally compressed, obtuse; lemmas awnless.

56. *Dichanthelium latifolium* (L.) Harvill

FIGURE 64

Dichanthelium latifolium (L.) Harvill, Castanea 42(2): 177. 1977.
Common name: broad-leaved panic grass.

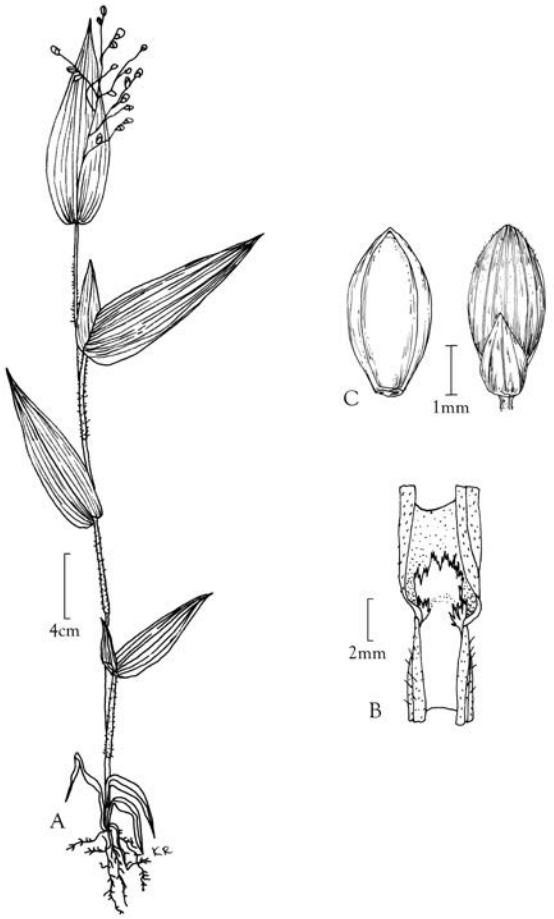

FIGURE 64. *Dichanthelium latifolium*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Shear s.n.* (US-US-972879); C modified from Hitchcock (1951).

Caespitose perennials; knotty rhizomes, rootstock evident. Culms 45–110 cm tall, erect, robust; internodes and nodes glabrous or sparsely pubescent; fall phase lateral branches ample, arising from mid-culm, scarcely rebranching. Leaves cauline, heterophyllous with a basal winter rosette; sheaths glabrous or pubescent, outer margin hairy; ligules 0.4–0.7 mm long, ciliate membrane; blades 3.5–7 times longer than wide, 15–40 mm wide, ascending or spreading, ovate-lanceolate, surfaces glabrous or rarely sparsely pubescent, margins tuberculate-ciliate, hairy and cordate clasping at base, apex acute. Panicles 7–15 cm long, 4–12 cm wide, open, ovate. Spikelets 2.9–3.9 mm long, 1.6–2 mm wide, ovate, dorsally compressed, acute; lemmas awnless.

57. *Dichanthelium laxiflorum* (Lam.) Gould

FIGURE 65

Dichanthelium laxiflorum (Lam.) Gould, Brittonia 26(1): 60. 1974.
Common names: lax-flowered panic grass, open-flowered rosette grass, soft-tufted panic grass.

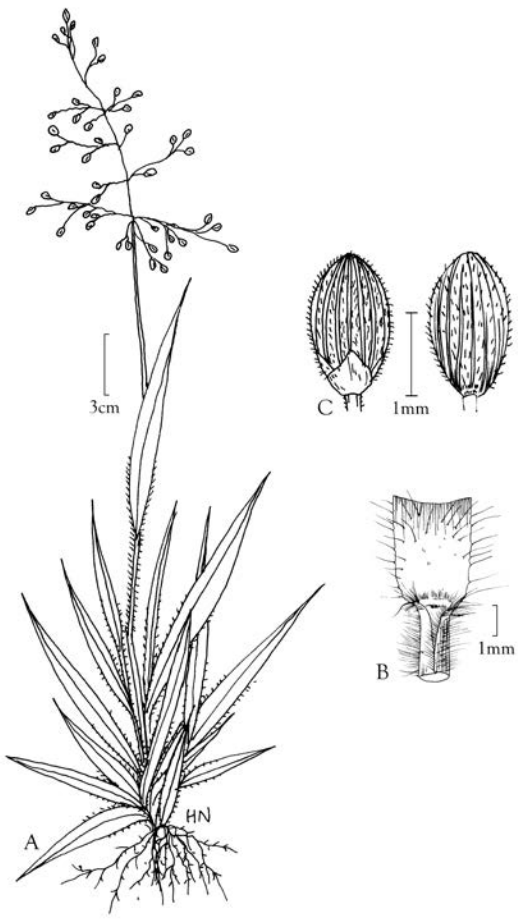

FIGURE 65. *Dichanthelium laxiflorum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Chase 549* (US-954337); C modified from Hitchcock (1951).

Mat-forming or densely caespitose perennials; butt sheaths pubescent. Culms 15–55 cm tall, erect or radiating from large predominantly basal leaves; internodes distally glabrous; nodes bearded; fall phase branching extensively from the basal nodes, forming a dense cushion during the winter. Leaves cauline, heterophyllous with a basal winter rosette; sheaths usually longer than the internodes, glabrous on surface or hirsute, with simple hairs or reflexed hairs, outer margin hairy; ligules 0.2–1 mm long, eciliate membranes, erose or ciliolate membranes; blades 4–17 cm long, 4–12 mm wide, lanceolate, flat, yellowish green, surfaces glabrous, pubescent, or sparsely hairy, margins smooth or ciliate, base broadly rounded, apex acute. Panicles 7–12 cm long, 3–8 cm wide, open, pyramidal, loose. Spikelets 1.7–2.3 mm long, 1–1.2 mm wide, solitary, spreading, oblong or ovate, dorsally compressed, obtuse; lemmas awnless.

58. *Dichanthelium linearifolium* (Scribn.) Gould

FIGURE 66

Dichanthelium linearifolium (Scribn.) Gould, Brittonia 26(1): 60. 1974.

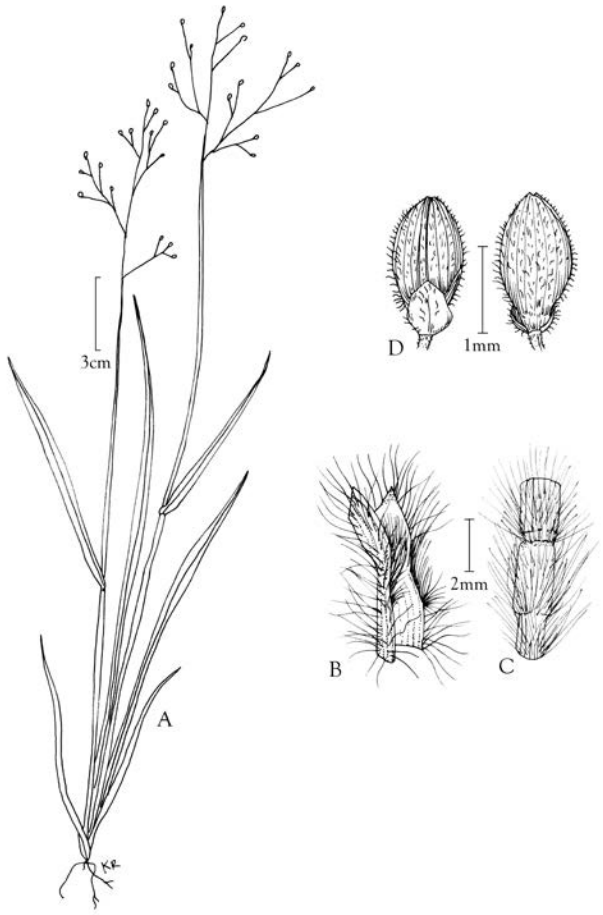

FIGURE 66. *Dichanthelium linearifolium*. A. Habit. B. Sheath, ligule, and blade, lateral view. C. Sheath and blade, dorsal view. D. Spikelets. A, B drawn from *Leonard 21139* (US-2344683); C modified from Barkworth et al. (2003); D modified from Hitchcock (1951).

Common names: low panic grass, slim-leaved panic grass, slim-leaved rosette grass.

Caespitose perennials. Culms 10–50 cm tall, very slender, erect or drooping; internodes elongated, distally glabrous or pubescent; nodes bearded; lateral branches sparse; fall phase developing a dense mass of erect blades and short branches. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths pilose, longer than internodes; ligules about 0.5 mm long, fringe of hairs; blades 5–20 cm long, 2–5 mm wide, linear or lanceolate, flat or involute, surfaces glabrous, pilose or hispid, hairy abaxially, margins sparsely hairy, apex attenuate. Panicles 4–10 cm long, 2–6 cm wide, open, elliptic, bearing few spikelets. Spikelets 2–3.2 mm long, 0.8–1.4 mm wide, elliptic, with obtuse base, dorsally compressed, obtuse; lemmas awnless.

59. *Dichanthelium lucidum* (Ashe) LeBlond

FIGURE 67

Dichanthelium lucidum (Ashe) LeBlond, Sida 19(4): 831–832. 2001.
Common name: bog panic grass.

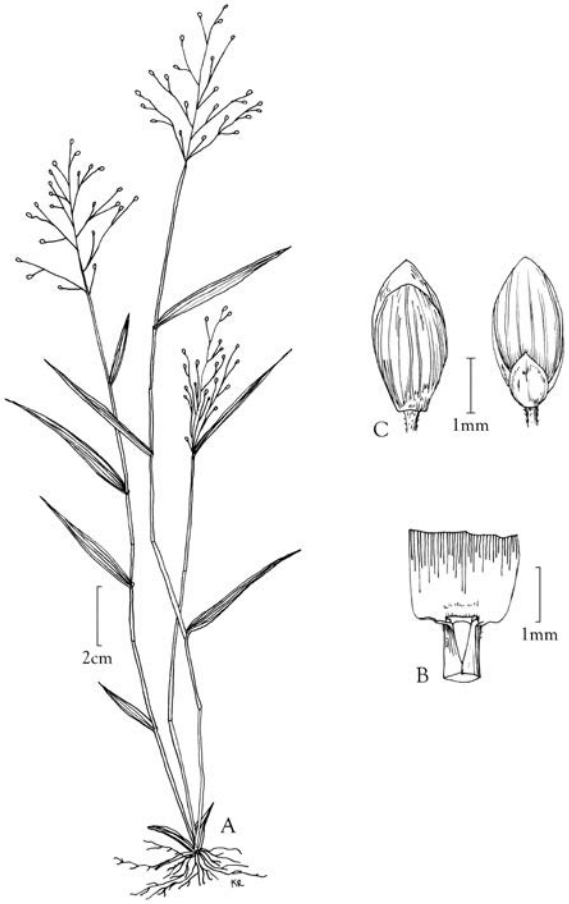

FIGURE 67. *Dichanthelium lucidum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Lamson-Scribner s.n.* (US-208289) and *Kearney s.n.* (US-722454); C modified from Hitchcock (1951).

Caespitose perennials. Culms 30–90 cm tall, erect but weak culms soon decumbent; internodes often flattened, glabrous; fall phase with decumbent culms and ample axillary elongated branches widely divergent, not forming fascicles. Leaves basal and cauline; sheath surface glabrous; ligules minute, ciliate membrane; blades 3.5–7 cm long, 3–6 mm wide, thin, lanceolate, flat, asending or widely spreading, surfaces and margins glabrous, apex acute. Panicles 2–6 cm long, open, lax, inconspicuous, not well exserted. Spikelets 1.8–2.3 mm long, ellipsoid; lemma awnless.

60. *Dichanthelium mattamuskeetense* (Ashe) Mohlenbr.

FIGURE 68

Dichanthelium mattamuskeetense (Ashe) Mohlenbr., Erigenia 6: 26. 1985.
Common name: cypress panic grass.

Sparsely caespitose perennials; butt sheaths sparsely hairy or pubescent. Culms 50–120 cm tall, erect; glabrous except lowermost nodes bearded; fall phase sparingly branched. Leaves cauline; sheaths velvety-pilose on upper part, sometimes glabrous; ligules 0.4–1.1 mm long, fringe of hairs; blades 6–16 cm long, 4–14 mm wide, horizontally spreading, lanceolate, flat, surface velvety-pubescent or upper blades glabrous, margins scabrous, base broadly rounded, apex acute. Panicles to 12 cm long, open, lance-ovoid to ovoid ellipsoid. Spikelets (2–)2.2–2.8 mm long; lemmas awnless.

61. *Dichanthelium meridionale* (Ashe) Freckmann

FIGURE 69

Dichanthelium meridionale (Ashe) Freckmann, Phytologia 39(4): 270–271. 1978.
Common name: southern hairy panic.

Caespitose perennials. Culms 15–40 cm tall, erect, appressed pubescent or the upper portion nearly glabrous; lateral branches sparse; internodes pubescent; nodes bearded; fall phase

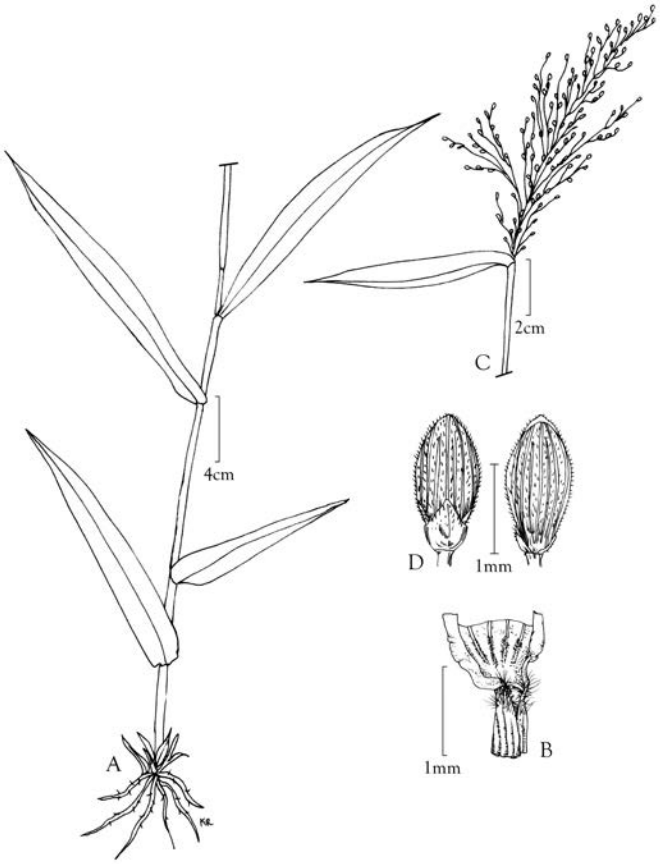

FIGURE 68. *Dichanthelium mattamuskeetense*. A. Base of culm B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A, C drawn from *Chase 3791* (US-954908, US-954909); B modified from Barkworth et al. (2003); D modified from Hitchcock (1951).

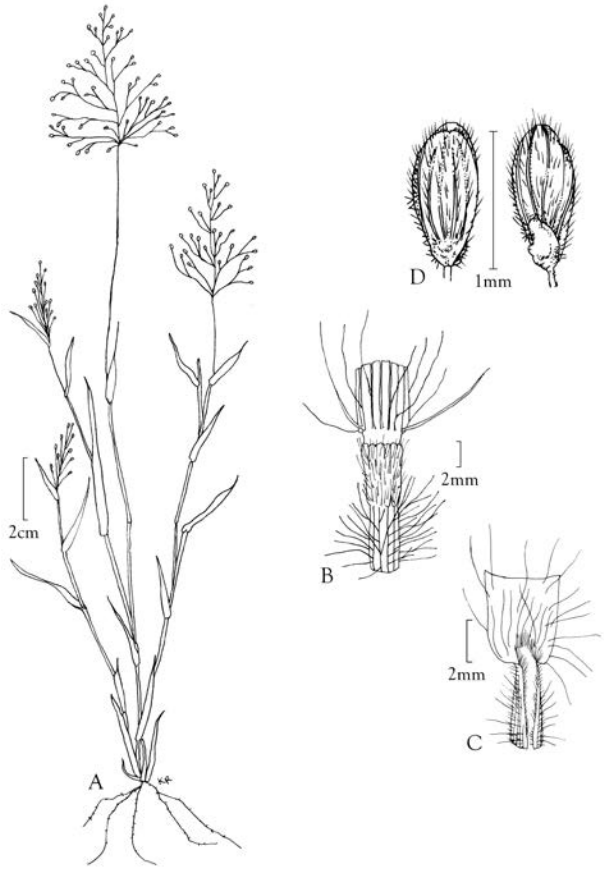

FIGURE 69. *Dichanthelium meridionale*. A. Habit. B. Sheath and blade, dorsal view. C. Sheath, ligule, and blade. D. Spikelets. A–C drawn from *Van Eseltine 488* (US-642961, US-642978); D modified from Hitchcock (1951).

branching extensively from the lower and mid-culm nodes with conspicuous flabellate fascicles of branches and reduced leaves. Leaves mostly basal; lower internodes and sheaths pilose, upper minutely appressed-pubescent; ligules 2–3.4 mm long, fringe of hairs; blades (1.5–)3–7 cm long, 2–7 mm wide, lanceolate, flat, surfaces pilose, grayish-villous beneath, margins sparsely hairy, apex acute. Panicles 1.5–5 cm long, open, long-exserted. Spikelets 1.3–1.7 mm long; lemmas awnless.

62. *Dichanthelium oligosanthes* (Schult.) Gould

FIGURE 70

Dichanthelium oligosanthes (Schult.) Gould, Brittonia 26(1): 60. 1974.

Common names: few-flowered panic grass, Heller's rosette grass.

Caespitose perennials with caudices. Culms 20–75 cm tall; internodes distally glabrous or pubescent or hirsute; nodes glabrous, lateral branches ample; fall phase branching from mid-culm nodes and rebranching, developing bushy clumps of blades.

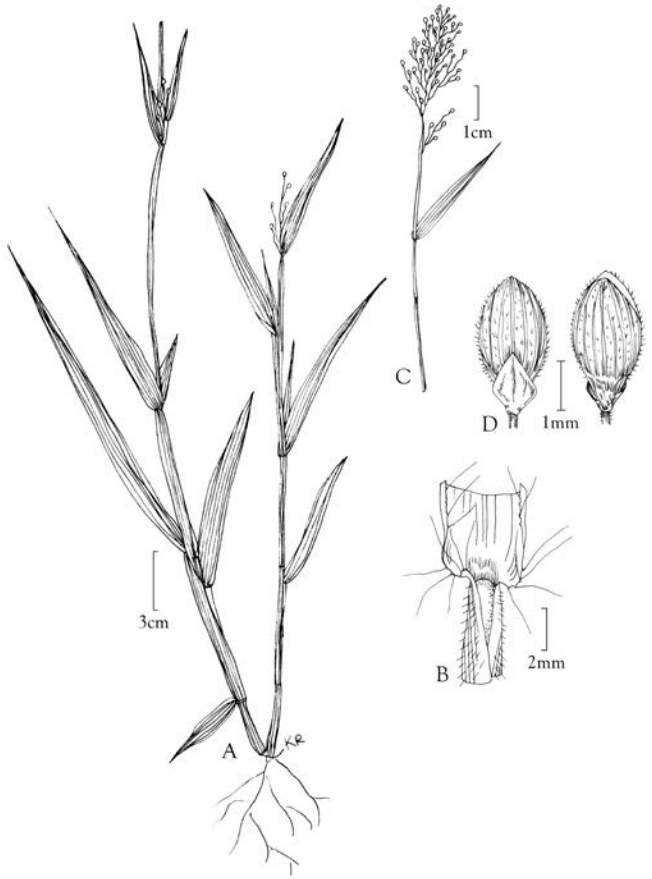

FIGURE 70. *Dichanthelium oligosanthes*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Spikelets. A–C drawn from *Lamson-Scribner s.n.* (US-743743); D. modified from Hitchcock (1951).

Leaves basal and cauline; leaves heterophyllous with a basal winter rosette; sheaths glabrous or hispid, with tubercle-based hairs, outer margins hairy; ligules 1–3 mm long, fringe of hairs; blades 3.5–10 cm long, 4–9 mm wide, lanceolate, flat, surfaces glabrous or pubescent, bases rounded to truncate, margins cartilaginous, apex acute. Panicles 5–9 cm long, 3–6 cm wide, open, terminal and axillary, ovate. Spikelets 2.7–4.2 mm long, elliptic or obovate, dorsally compressed, obtuse or subacute; lemmas awnless.

63. *Dichanthelium ravenelii* (Scribn. & Merr.) Gould

FIGURE 71

Dichanthelium ravenelii (Scribn. & Merr.) Gould, Brittonia 26(1): 60. 1974.

Common names: Ravenel's panic grass, Ravenel's rosette grass.

Stout caespitose perennials with caudices. Culms 25–75 cm tall; internodes pilose; nodes densely bearded; collars densely pubescent; lateral branches clustered, arising from middle and upper culms; fall phase with nearly erect culms, branching from middle to upper culm nodes, branches short, ascending, and

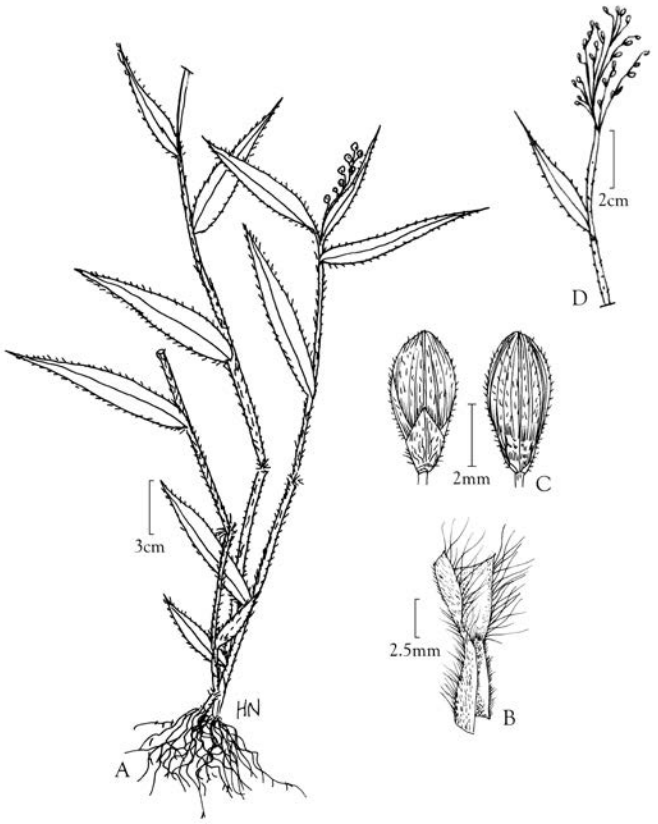

FIGURE 71. *Dichanthelium ravenelii*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. D. Upper culm and panicle. A–C drawn from *Steele s.n.* (US-349739); D modified from Hitchcock (1951).

bushy. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths pubescent, with tubercle-based hairs; collars densely pubescent; ligules 2.5–4 mm long, fringe of hairs; collars densely pubescent; blades 8–17 cm long, 8–25 mm wide, lanceolate, flat, densely short-velvety or puberulent abaxially, adaxial surfaces glabrous or sparsely pilose, margins with papillose-based cilia, apex acuminate. Panicles 5–11 cm long, almost as wide as long, open, ovate, terminal and axillary. Spikelets 3.7–4.3 mm long, oblong or obovate, with acute base, dorsally compressed, compressed slightly, obtuse; lemmas awnless.

64. *Dichanthelium scabriusculum* (Elliott) Gould & C. A. Clark

FIGURE 72

Dichanthelium scabriusculum (Elliott) Gould & C. A. Clark, Ann. Missouri Bot. Gard. 65(4): 1110. 1979.

Common names: tall swamp panic grass, woolly rosette grass.

Caespitose perennials in large clumps; rhizomes sometimes present. Culms 70–150 cm tall; internodes scaberulous to almost glabrous; nodes glabrous; lateral branches sparse; fall phase branching from middle and upper nodes developing numerous, well-separated, dense fascicles of reduced blades and secondary panicles. Leaves cauline, heterophyllous with a basal winter rosette; sheaths glabrous or hirsute, with tubercle-based hairs; collars puberulent; ligules 0.5–1.2 mm long, eciliate membranes, usually with some small terminal cilia; blades 12–25 cm long, 7–15 mm wide (5–9 mm wide in winter rosette), lanceolate, flat, surfaces glabrous or pilose, hairy abaxially, margins ciliate, hairy at base and somewhat cordate, apex acuminate. Panicles 10–21 cm long, 6–13 cm wide, open, elliptic or ovate. Spikelets 2.2–2.8 mm long, elliptic, dorsally compressed, obtuse; lemmas awnless.

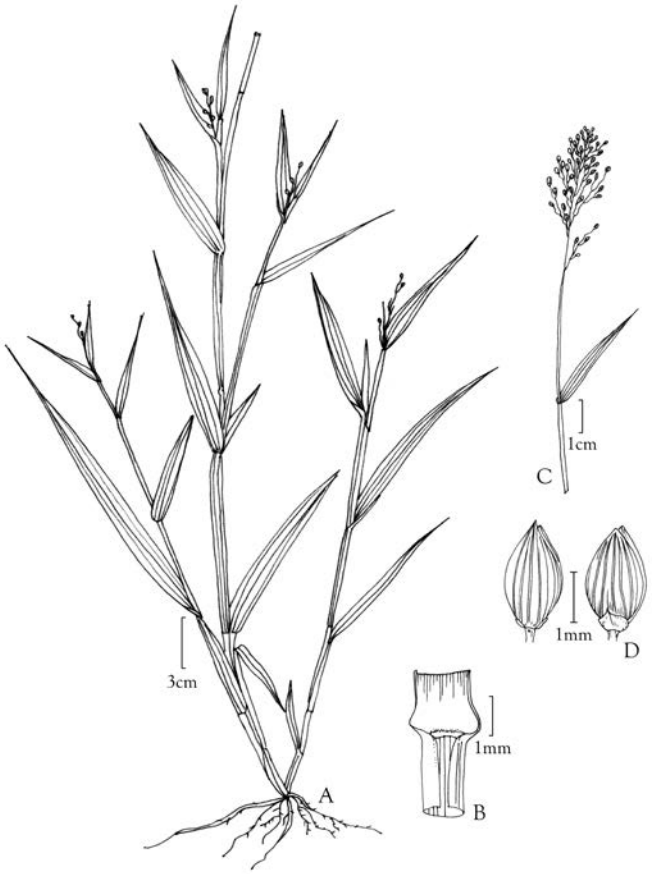

FIGURE 72. *Dichanthelium scabriusculum*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Spikelets. A–C drawn from *Sargent K-29* (US-2079685); D modified from Hitchcock (1951).

65. *Dichanthelium scoparium* (Lam.) Gould

FIGURE 73

Dichanthelium scoparium (Lam.) Gould, Brittonia 26(1): 60. 1974.

Common names: broom rosette grass, velvety panic grass.

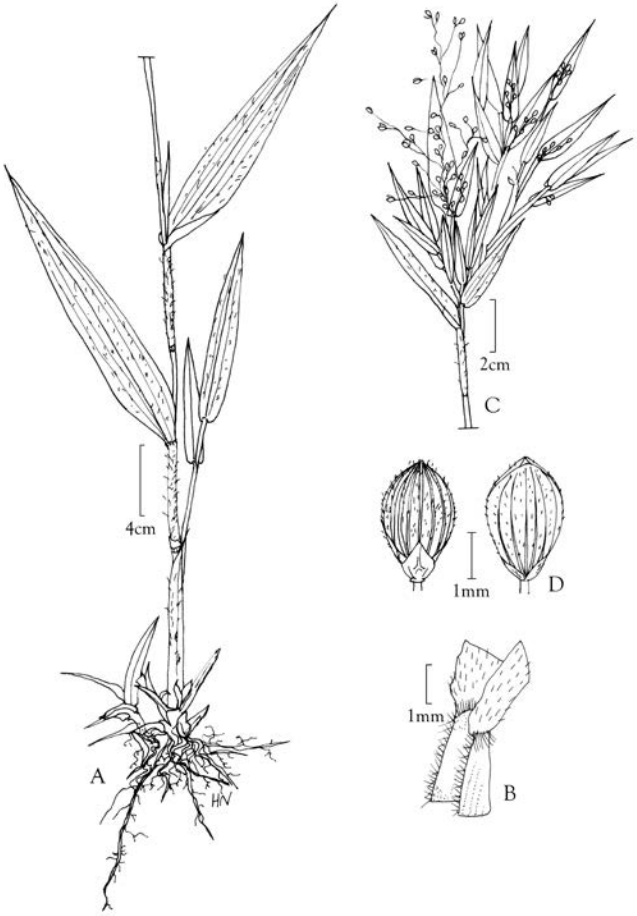

FIGURE 73. *Dichanthelium scoparium*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Spikelets. A–C drawn from *Strong & Simmons 1957* (US-3380566); D modified from Hitchcock (1951).

Perennials, in small clumps with short, knotty rhizomes; butt sheaths woolly. Culms 50–150 cm tall, stout, geniculately ascending; internodes glandular (below nodes), distally pubescent, nodes often swollen, pubescent; lateral branches ample; fall phase leaning or spreading, freely branching from the middle nodes, the branches clustered. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths velvety, except the glabrous sticky summit; ligules 0.5–2 mm long, fringe of hairs; blades 9–20 cm long, 9–20 mm wide (13–30 mm wide in winter rosette), lanceolate, flat, venation distinct, surfaces puberulous or pubescent, hairy abaxially, margins ciliate basally, bases rounded to subcordate, apex acute. Panicles 6–16 cm long, open, terminal and axillary, ovate. Spikelets 2.2–2.8 mm long, oblong or ovate, with obtuse base, dorsally compressed; lemmas awnless.

66. *Dichanthelium sphaerocarpon* (Elliott) Gould

FIGURE 74

Dichanthelium sphaerocarpon (Elliott) Gould, Brittonia 26(1): 60. 1974.

Common names: round-fruited panic grass, round-seed rosette grass.

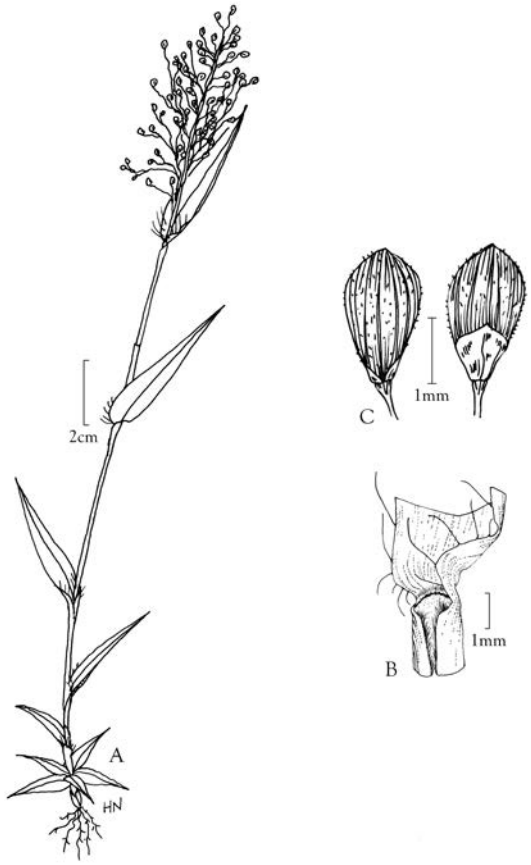

FIGURE 74. *Dichanthelium sphaerocarpon*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Leonard 10260* (US-1769836); C modified from Hitchcock (1951).

Caespitose perennials. Culms 15–50 cm long, spreading, geniculately ascending or decumbent; nodes glabrous or pubescent; lateral branches sparse; fall phase sparsely branching from the basal nodes, nodes pubescent or glabrous, internodes glabrous. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths glabrous, outer margins hairy, sometimes overlapping near the bases; ligules 0–0.8 mm long, fringe of hairs or absent; blades 12–25 cm long, 7–15 mm wide, lanceolate, flat, light green, surfaces glabrous, margins white tuberculate-ciliate, bases hairy and cordate, apex acute. Panicles 4–14 cm long, nearly as wide, open, ovate or pyramidal. Spikelets 1.4–1.8 mm long, oblong or orbicular or obovate, with obtuse base, dorsally compressed, obtuse; lemmas awnless.

67. *Dichanthelium villosissimum* (Nash) Freckmann

FIGURE 75

Dichanthelium villosissimum (Nash) Freckmann, Phytologia 39(4): 270. 1978.

Common names: white-haired panic grass, white-haired rosette grass.

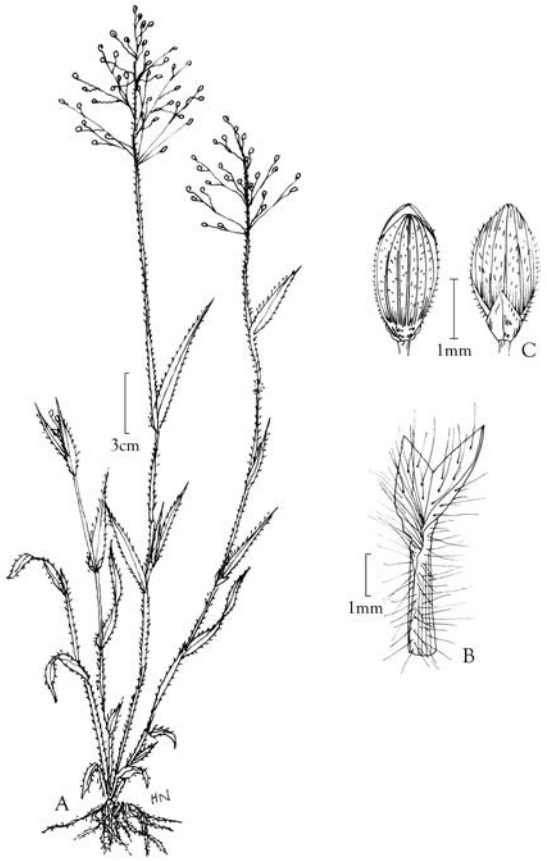

FIGURE 75. *Dichanthelium villosissimum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Hitchcock 1608* (US-559134); C modified from Hitchcock (1951).

Densely clumped caespitose perennials; butt sheaths woolly. Culms 25–45 cm tall, olive green, distally hirsute, nodes bearded; lateral branches sparse; fall phase with decumbent to prostrate culms, branching and forming dense fascicles with reduced blades and secondary panicles. Leaves basal and cauline, heterophyllous with a basal winter rosette; sheaths glabrous or pilose, outer margin glabrous or hairy; ligules 2–5 mm long, ciliate membranes; blades 6–15 cm long, 6–10 mm wide (8–15 mm wide in winter rosette), lanceolate, flat, both surfaces pubescent, margins tuberculate-ciliate, bases broadly rounded and hairy, apex attenuate. Panicles 7–12 cm long, 5–10 cm wide, open, elliptic or ovate. Spikelets 2.1–2.5 mm long, oblong or orbicular or obovate, with obtuse base, dorsally compressed, obtuse; lemmas awnless.

68. *Dichanthelium yadkinense* (Ashe) Mohlenbr.

FIGURE 76

Dichanthelium yadkinense (Ashe) Mohlenbr., Erigenia 6: 27. 1985.
Common name: Yadkin River panic grass.

Caespitose perennials. Culms 50–100 cm tall, weak, erect; internodes glabrous; nodes glabrous or sparsely pilose; fall phase suberect, sparsely branched from mid-culm nodes, blades are not greatly reduced as in the other species. Leaves cauline; sheaths glabrous, often with pale glandular spots between prominent veins, margins glabrous; ligules less than 1 mm long, ciliate membranes; blades 7–14 cm long, 7–12 mm wide, flat, lanceolate, surfaces glabrous, glandular spots between the prominent veins, margins scabrous, tapering at both ends, apex acute. Panicles 5–14 cm long, open. Spikelets 2–2.6 mm long, elliptic to subfusiform, apex pointed; lemmas awnless.

69. *Digitaria ciliaris* (Retz.) Koeler

FIGURE 77

Digitaria ciliaris (Retz.) Koeler, Descr. Gram. 27. 1802.
Common name: southern crabgrass.

Mat-forming and caespitose annuals; butt sheaths pubescent. Culms 10–100 cm long, decumbent, rooting at lower nodes, branching. Leaves basal and cauline; sheaths with papillose-based

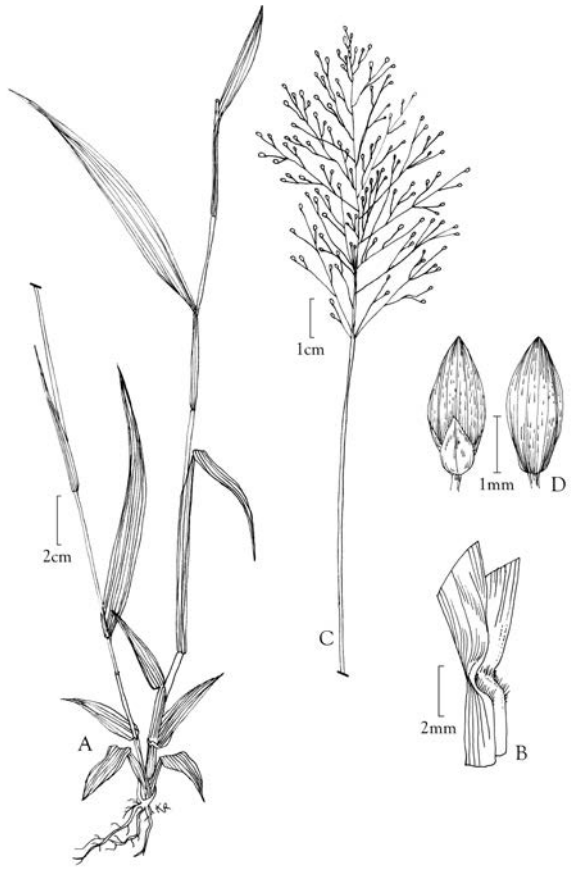

FIGURE 76. *Dichanthelium yadkinense*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Spikelets. A–C drawn from *Allard 20597* (US-2180136); D modified from Hitchcock (1951).

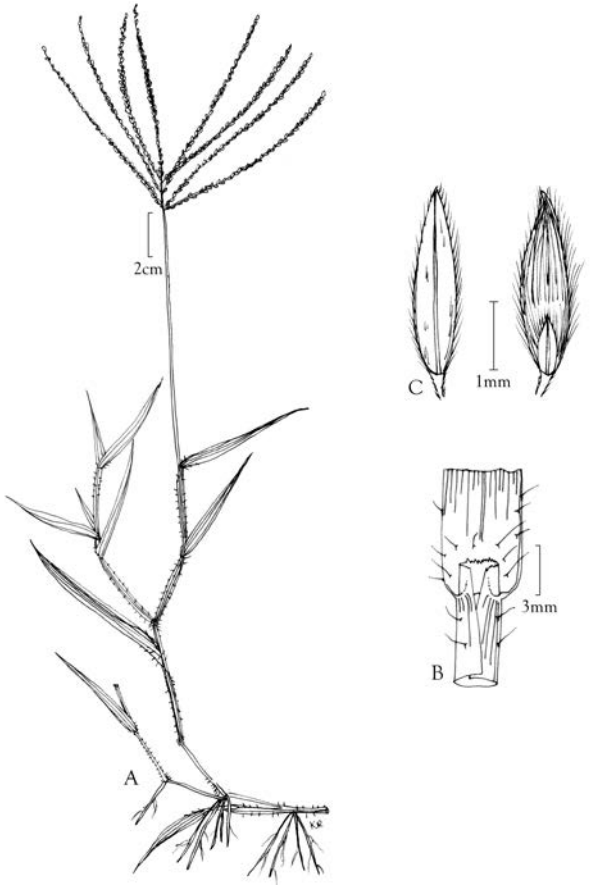

FIGURE 77. *Digitaria ciliaris*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Carnes 100* (US-1724417) and *Fosberg 65956* (US-3337863); C modified from Barkworth et al. (2003).

hairs; ligules 2–3.5 mm long, eciliate membranes, apex erose; blades 1.5–14.4(–18.9) cm long, 3–9 mm wide, linear, flat, surfaces glabrous or scabrous, margins scabrous, apex acute. Spikelike racemes 6–22 cm long, 2–12, digitately arranged, unilateral. Spikelets (2.7–)2.8–4.1 mm long, appressed, in pairs, packing contiguous, oblong or orbicular or obovate, dorsally compressed, obtuse; lemmas awnless.

70. *Digitaria filiformis* (L.) Koeler

FIGURE 78

Digitaria filiformis (L.) Koeler, Descr. Gram. 26. 1802.
Common names: finger grass, slender crabgrass.

Caespitose annuals or short-lived perennials; butt sheaths with white hairs. Culms (10–)25–150 cm tall, erect or decumbent, branching, sometimes rooting at lower nodes. Leaves mostly basal; sheaths usually with papillose-based hairs, keeled; ligules 0.3–1.5 mm long, eciliate membranes, apex truncate, subentire; blades 5–18 cm long, 1–6 mm wide, linear, flat, surfaces scabrous above, margins glabrous, apex acute. Spikelike racemes 7–13 cm long, single, paired, or digitately or subdigitately borne along a central axis, unilateral. Spikelets 1.3–2.8 mm long, in pairs, elliptic, dorsally compressed; lemmas awnless.

71. *Digitaria ischaemum** (Schreb.) Muhl.

FIGURE 79

*Digitaria ischaemum** (Schreb.) Muhl., Descr. Gram. 131. 1817.
Common names: small crabgrass, smooth crabgrass.

Caespitose annuals. Culms 20–55(–70) cm long, geniculately ascending or decumbent, rooting at lower nodes. Leaves mostly basal; sheaths glabrous or sparsely pubescent; ligules 0.6–2.5 mm long, eciliate membranes, apex truncate, erose; blades 1.5–9 cm long, 3–5 mm wide, linear, flat, surfaces glabrous, with a few papillose-based hairs basally, margins scabrous, apex acute. Spikelike racemes 1.5–7 cm long, 2–8,

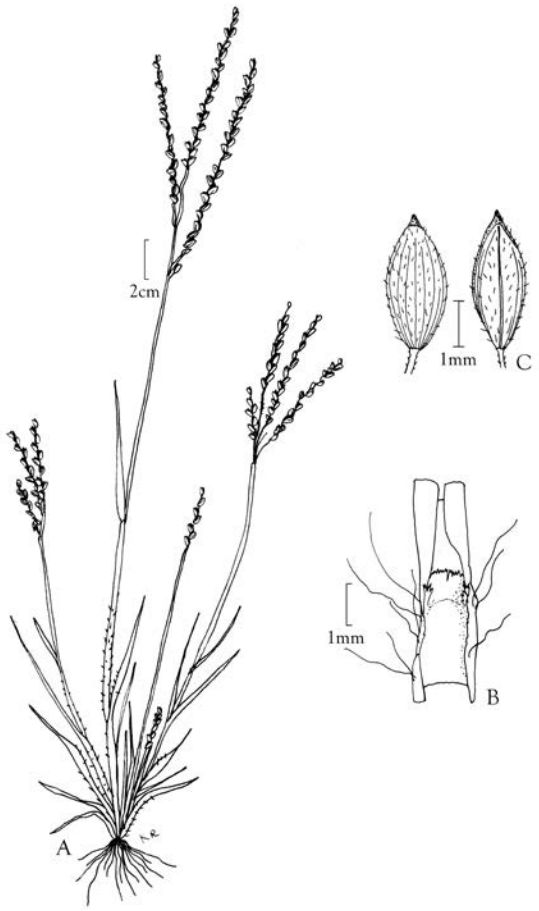

FIGURE 78. *Digitaria filiformis*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Leonard 6117a* (US-2151596); C modified from Barkworth et al. (2003).

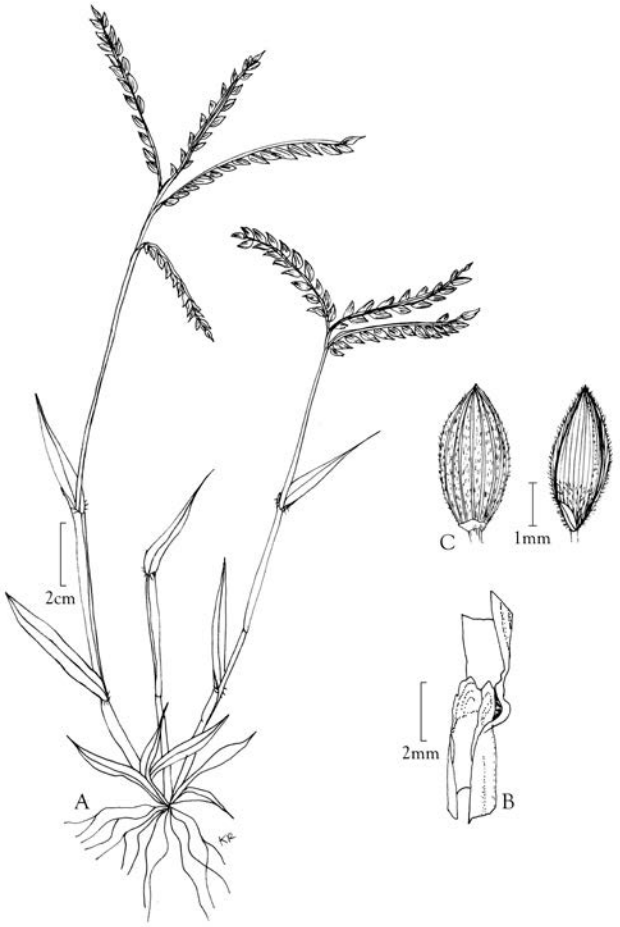

FIGURE 79. *Digitaria ischaemum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Allard 20894* (US-2180034); C modified from Barkworth et al. (2003).

digitately or subdigitately arranged, unilateral, rachis winged. Spikelets 1–2.3 mm long, in threes, elliptic, dorsally compressed, subacute; lemmas awnless.

72. *Digitaria sanguinalis** (L.) Scop.

FIGURE 80

Digitaria sanguinalis* (L.) Scop., Fl. Carniol. (ed. 2) 1: 52. 1771.
Common names: crabgrass, hairy crabgrass, northern crabgrass.

Annuals. Culms 20–70(–112) cm long, decumbent or prostrate, much branched rooting from lower nodes; nodes glabrous or bearded. Leaves basal and cauline; sheaths pilose, keeled; ligules 0.5–2.6 mm long, eciliate membranes, apex erose, lacerate, truncate; blades 2–11(–14) cm long, 3–8(–12) mm wide, linear, flat, surfaces hairy both sides, margins scabrous, apex acute. Spikelike racemes 4–18 cm long, 4–10, digitately or subdigitately arranged, unilateral. Spikelets 1.7–3.4 mm long, in pairs, elliptic, dorsally compressed, acute; lemmas awnless.

73. *Diplachne fusca* subsp. *fascicularis* (Lam.) P. M. Peterson & N. Snow

FIGURE 81

Diplachne fusca **subsp.** *fascicularis* (Lam.) P. M. Peterson & N. Snow, Ann. Bot. (Oxford) 109: 1327. 2012. [Syn. *Leptochloa fusca* (L.) Kunth subsp. *fascicularis* (Lam.) N. Snow.]
Common names: bearded sprangletop, feather grass.

Annuals or short-lived perennials. Culms 5–170 cm long, decumbent, sometimes rooting from lower nodes, often branching. Leaves basal and cauline; sheaths glabrous or scabrous; ligules 3–8 mm long, eciliate membrane, apex acute to attenuate; blades 3–50 cm long, 2–7 mm wide, linear, flat or convolute, stiff, gray-green, midrib widened, surfaces glabrous or scabrous, margins scabrous, apex attenuate. Panicles 15–30 cm long with 10–30 spicate primary branches (racemes) borne along a central axis, erect, straight. Spikelets 5–12(–14) mm long, packed broadside

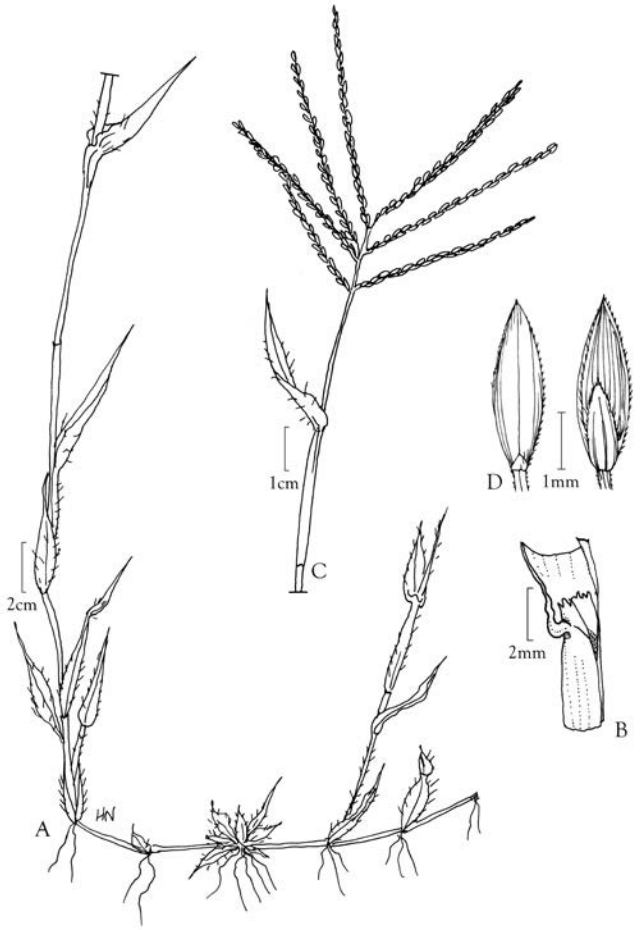

FIGURE 80. *Digitaria sanguinalis*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and inflorescence. D. Spikelets. A–C drawn from *Chase 12706* (US-3110861); D modified from Hitchcock (1951).

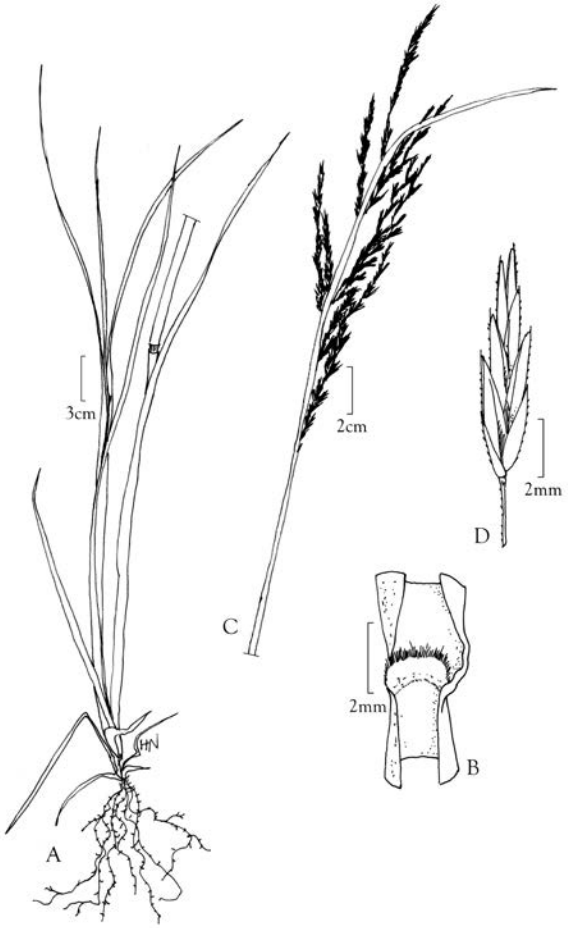

FIGURE 81. *Diplachne fusca* ssp. *fascicularis*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Steury 000902.2* (US-3376345).

to the rachis, elliptic, laterally compressed, compressed slightly; principal lemma awns 0.3–5 mm long, from a sinus.

74. *Echinochloa crusgalli** (L.) P. Beauv.

FIGURE 82

*Echinochloa crusgalli** (L.) P. Beauv., Ess. Agrostogr. 1: 53, 161, 169, pl. 11, f. 2. 1812.

Common names : barnyard grass, large barnyard grass.

Caespitose annuals. Culms 30–200 cm tall, geniculately ascending or decumbent; nodes glabrous or the lower ones puberulent. Leaves basal and cauline; sheaths compressed, glabrous; ligules absent; blades 8–65 cm long, 5–30 mm wide, linear, flat, surfaces and margins sparsely hairy, apex acute. Panicles 5–25 cm long with 5–15 ascending primary branches borne along a central axis; primary branches 2–10 cm long, the spikelets densely packed, irregular, 2–4-rowed, unilateral. Spikelets 2.5–4 mm long, in pairs or clustered at each node, elliptic, dorsally compressed, gibbous, acuminate; lemma awns 0–50 mm long on lower sterile floret, terminal.

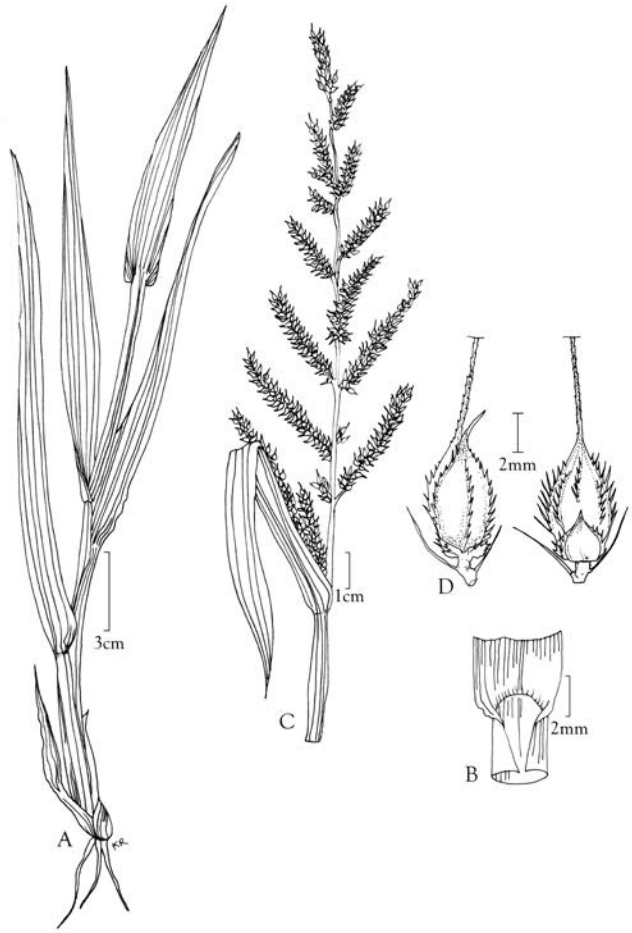

FIGURE 82. *Echinochloa crusgalli*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Kanal 2406* (US-3268322); D modified from Barkworth et al. (2003).

75. *Echinochloa muricata* (P. Beauv.) Fernald

FIGURE 83

Echinochloa muricata (P. Beauv.) Fernald, Rhodora 17(198): 106. 1915.

Common names: American barnyard grass, rough barnyard grass.

Annuals. Culms 80–160 cm tall, erect or geniculately ascending, sometimes rooting at the lower nodes, lower nodes glabrous or puberulent, upper nodes glabrous. Leaves basal and cauline; sheaths glabrous; ligules absent; blades 1–27 cm long, 0.8–30 mm wide, linear, flat, surfaces glabrous, margins spinulose, apex acute. Panicles 10–35 cm long with 8–15 spreading primary branches borne along a central axis; primary branches 2–8 cm long, unilateral, rachis subterete, the spikelets densely

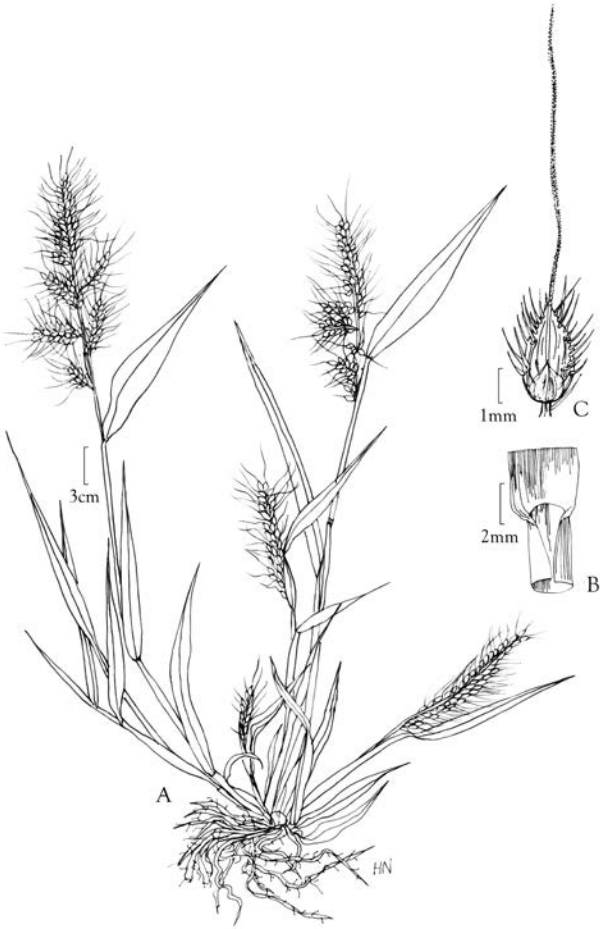

FIGURE 83. *Echinochloa muricata*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Fosberg 23913* (US-3369205); D modified from Barkworth et al. (2003).

packed, 4-rowed. Spikelets 2.5–5 mm long, in pairs, ovate, dorsally compressed, gibbous, cuspidate; lower lemmas unawned or awned, the awns to16 mm long.

76. *Echinochloa walteri* (Pursh) A. Heller

FIGURE 84

Echinochloa walteri (Pursh) A. Heller, Cat. N. Amer. Pl. (ed. 2) 21. 1900.

Common names: coast barnyard grass, long-awned barnyard grass, long-awned cockspur grass.

Caespitose annuals. Culms (30–)100–200 cm tall, erect or geniculately ascending; internodes and nodes pubescent, occasionally glabrous. Leaves basal and cauline; sheaths hirsute or hispid, with tubercle-based hairs; ligules absent; blades to 55 cm long, 10–35(–60) mm wide, linear, flat, surfaces harshly scabrous, margins scabrous, apex acute. Panicles 10–40 cm long with 10–25 primary branches borne along a central axis; primary branches 2–17 cm long, unilateral, the spikelets densely packed, 4-rowed. Spikelets 3–5 mm long, in pairs, ovate, dorsally compressed, gibbous, cuspidate; lemmas awns 5–25(–60) mm long on the lower sterile floret.

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

FIGURE 85

*Eleusine indica** (L.) Gaertn., Fruct. Sem. Pl. 1: 8. 1788.

Common names: Indian goose grass, yard grass, wire grass.

Caespitose annuals, basal innovations flabellate. Culms 30–90 cm tall, geniculately ascending or decumbent, slender; internodes elliptical in section. Leaves mostly basal; sheaths conspicuously keeled, outer margins hairy; ligules 0.2–1 mm long, eciliate membranes, apex truncate, erose; blades 15–40 cm long, 3–7 mm wide, conduplicate, linear, prominent white midveins, surfaces glabrous, margins scabrous, apex acute. Spikelike branches 3.5–15.5 cm long, single (rarely) or digitately arranged

FIGURE 84. *Echinochloa walteri*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Archer 7440* (US-2475637); D modified from Barkworth et al. (2003).

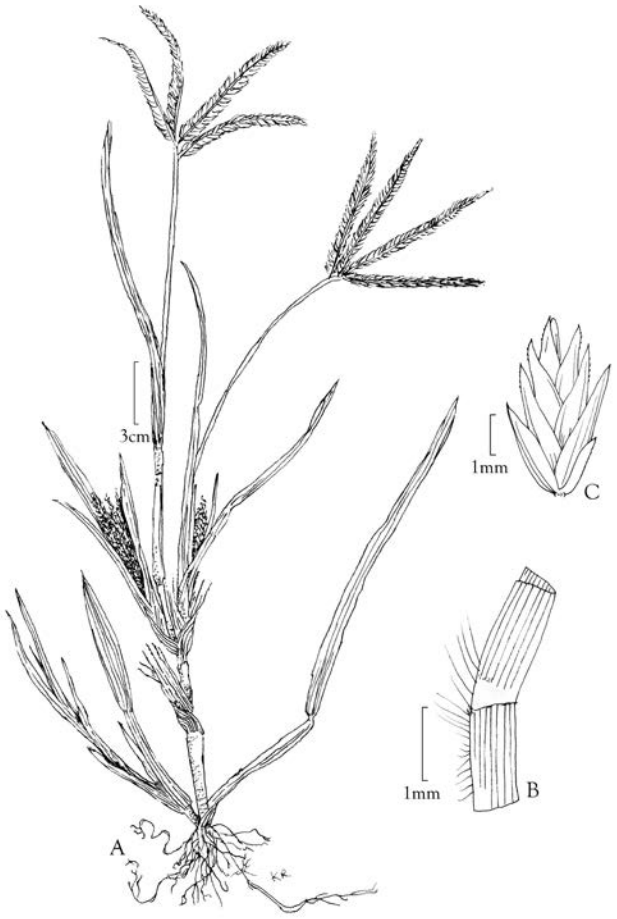

FIGURE 85. *Eleusine indica*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Leonard 19514* (US-1866464); C modified from Barkworth et al. (2003).

in a terminal cluster, unilateral. Spikelets 3–7 mm long, 2–3 mm wide, elliptic, laterally compressed; lemmas awnless.

78. *Elymus canadensis* L.

FIGURE 86

Elymus canadensis L., Sp. Pl. 1: 83–84. 1753.

Common names: Canada wildrye, great plains wildrye, nodding wildrye.

Caespitose perennials, rhizomes absent. Culms (40–)60–150(–180) cm long, decumbent. Leaves mostly basal; sheath glabrous, auricles falcate; ligules 0.5–1 mm long, eciliate membranes, apex truncate; blades 10–25 cm long, (3–)4–15(–20) mm wide, linear, flat or conduplicate, surfaces glabrous or pubescent, margins scabrous, apex acute. Spikes 8–20 cm long, deflexed or drooping, bilateral, spikelets arranged broadside to the rachis. Spikelets 12–15 mm long, 3 per node, elliptic to oblong, laterally compressed; principal lemma awns 15–50 mm long, flexuous.

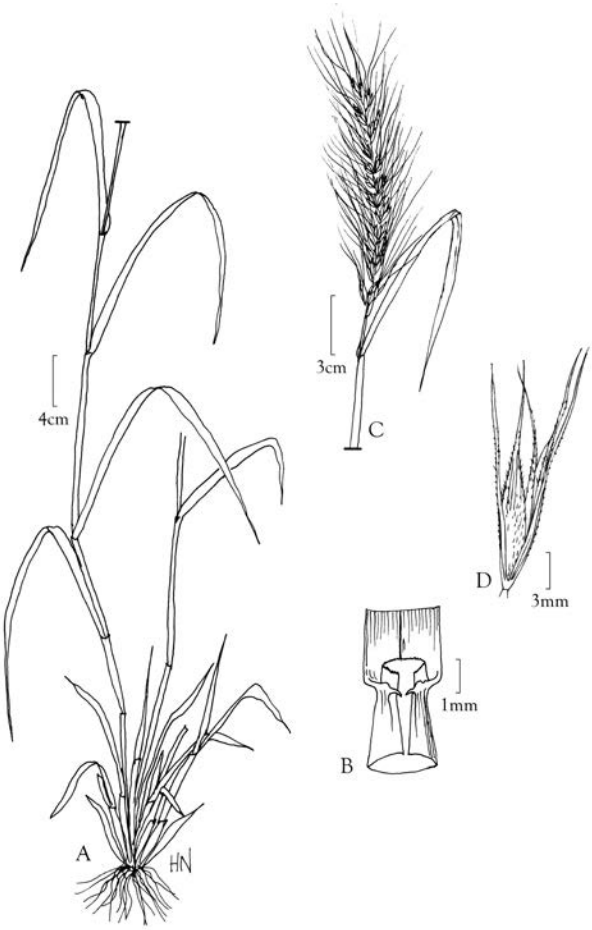

FIGURE 86. *Elymus canadensis*. A. Habit. B. Sheath, ligule, and blade. C. Spike. D. Spikelets. A–C drawn from *Seaman s.n.* (US-787244); D modified from Hitchcock (1951).

79. *Elymus elymoides** (Raf.) Swezey

FIGURE 87

*Elymus elymoides** (Raf.) Swezey, Doane Coll. Nat. Hist. Stud. 1: 155. 1891. [Known from a single collection, Kearney 7 (US-1021046) at Brookland and Terra Cotta, DC, 21 Jun 1897.]

Common name: western bottle-brush grass.

Caespitose perennials, often glaucous. Culms 8–65 cm tall, erect or geniculate. Leaves mostly basal; sheaths glabrous, scabrous or villous, auricles falcate; ligules shorter than 1 mm, eciliate membrane, apex truncate or lacerate; blades 5–20 cm long, (1–)2–4(–6) mm wide, linear, flat, surfaces and margins glabrous, apex acute. Spikes 3–20 cm long, 5–15 cm wide, bilateral erect to subflexuous. Spikelets 10–20 mm long, packed broadside to the rachis, 1–3 per node, spreading, cuneate, laterally compressed; principal lemma awns 20–100 mm long, curved, spreading; sometimes split into 2–3 unequal divisions.

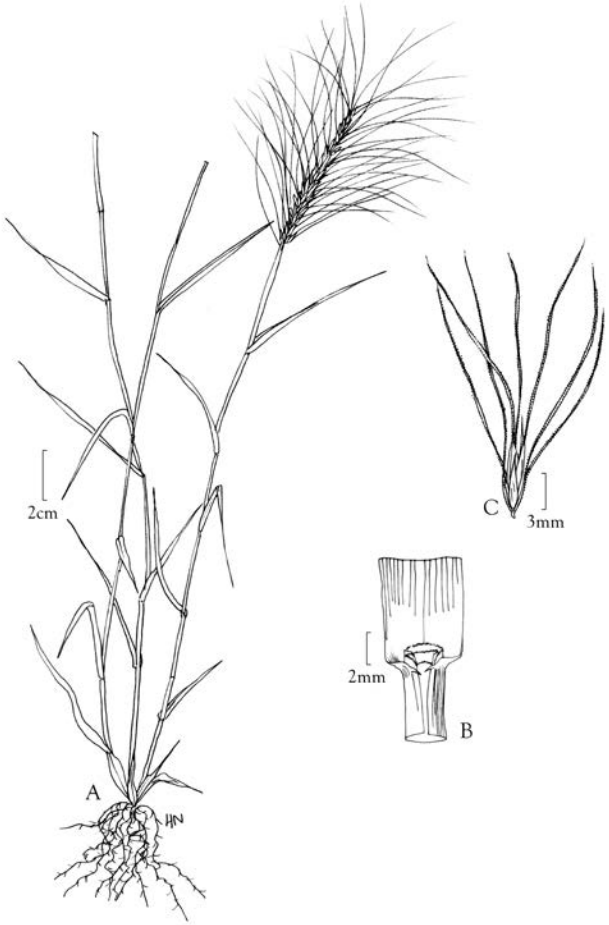

FIGURE 87. *Elymus elymoides*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. Drawn from *Kearney* 7 (US-1021046).

80. *Elymus glabriflorus* (Vasey ex L. H. Dewey) Scribn. & C. R. Ball

FIGURE 88

Elymus glabriflorus (Vasey ex L. H. Dewey) Scribn. & C. R. Ball, Bull. Div. Agrostol., U.S.D.A. 24: 49, f. 23. 1901.
Common name: southeastern wildrye.

Caespitose perennials, butt sheaths scarious. Culms 60–140 cm tall, decumbent. Leaves basal and cauline; sheath glabrous or pubescent, auricles absent or to 2 mm long, falcate; ligules 0.5–1 mm long, eciliate membranes, apex truncate; blades 15–40 cm long, 7–15 mm wide, linear, flat or conduplicate, surface glabrous or pubescent, margins scabrous, apex acute. Spikes 6–20 cm long, deflexed or drooping, bilateral. Spikelets 10–20 mm long, packed broadside to the rachis, spikelets 2 or 3(–5) per node, elliptic to oblong, laterally compressed; principal lemma awns 20–30 mm long, straight and sometimes flexuous.

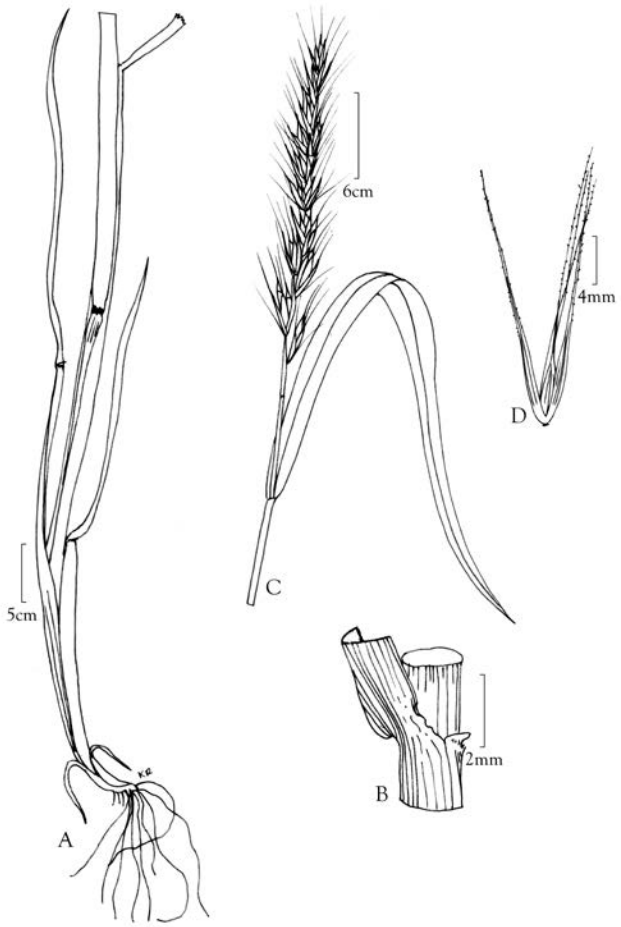

FIGURE 88. *Elymus glabriflorus*. A. Base of culm. B. Sheath, ligule, and blade. C. Spike. D. Spikelets. A, C drawn from *Hill s.n.* (US-3099519); B, D modified from Barkworth et al. (2007).

81. *Elymus hystrix* L.

FIGURE 89

Elymus hystrix L., Sp. Pl. 1: 560. 1753.
Common name: bottle-brush grass.

Caespitose perennials. Culms 50–140 cm tall, occasionally glaucous, erect; internodes glabrous or pubescent; nodes glabrous. Leaves basal and cauline; sheaths smooth or scaberulous, glabrous on surface or pubescent, with reflexed hairs, auricles 0.5–3 mm long, usually present; ligules 1–2(–3) mm long, eciliate membranes, apex erose; blades 4–16 mm wide, linear, flat, surfaces pilose or scaberulous, margins scabrous, apex attenuate. Spikes 7–20 cm long, 4–7 cm wide, bilateral, lax. Spikelets 10–18 mm long, packed broadside to the rachis, 2 per node, spreading, lanceolate, dorsally compressed; principal lemma awns 10–40 mm long, usually straight, rarely somewhat curved.

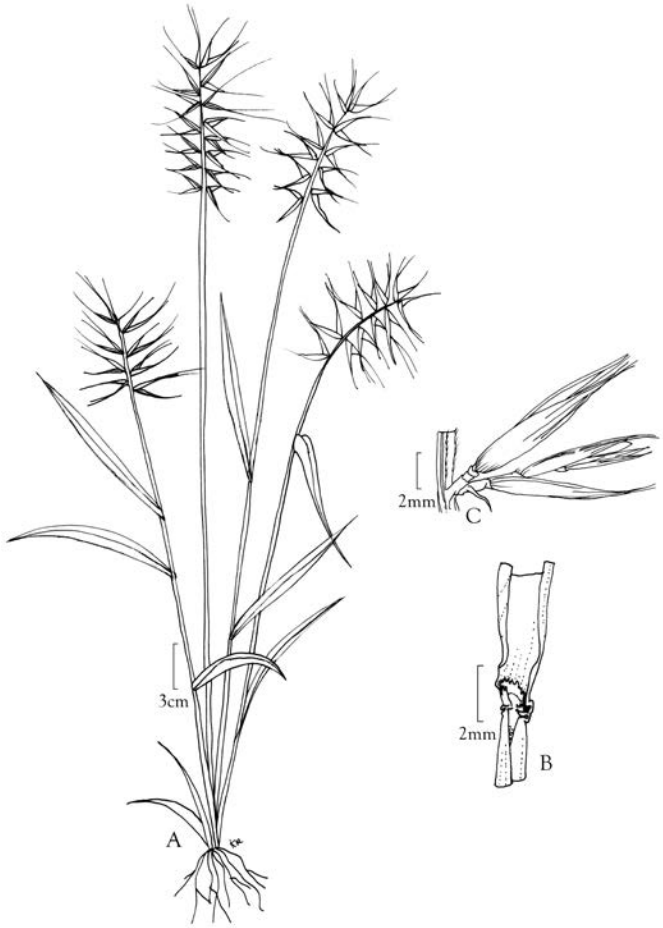

FIGURE 89. *Elymus hystrix*. A. Habit. B. Sheath, ligule, and blade. C. Node with spikelets. A, B drawn from *Allard 20528* (US-2180078); C modified from Barkworth et al. (2007).

82. *Elymus macgregorii* R. Brooks & J. J. N. Campb.

FIGURE 90

Elymus macgregorii R. Brooks & J. J. N. Campb., J. Kentucky Acad. Sci. 61(2): 88. 2000.
Common name: early wildrye.

Caespitose perennials, usually glaucous. Culms 40–120 cm tall, erect or slightly decumbent, glabrous. Leaves mostly basal; sheaths usually glabrous, rarely villous, auricles 2–3 mm long, falcate; ligules 0.4–0.9 mm long, eciliate membrane, purple, apex truncate; blades 7–15 mm wide, drooping, dark green or glaucous, glabrous to occasionally villous, linear, flat, surfaces usually glabrous to occasionally villous adaxially, margins scabrous; apex acute. Spikes 4–12 cm long, (1.7–)2.2–3.4(–4) cm wide, packed broadside to the rachis, lax, 4–5 spikelets per centimeter. Spikelets 10–15 mm long, 2 per node, elliptic to oblong, dorsally compressed; principal lemma awns (15–)20–30 mm long, straight.

83. *Elymus repens** (L.) Gould

FIGURE 91

*Elymus repens** (L.) Gould, Madroño 9(4): 127. 1947.
Common names: creeping wildrye, couch grass, quack grass, witch grass.

Caespitose perennials or culms solitary, rhizomes elongated, basal innovations extravaginal. Culms 50–100(–150) cm tall, erect. Leaves cauline; sheaths glabrous or pilose, auricles 0.3–1 mm long, falcate; ligules 0.3–1.5 mm long, eciliate membranes, apex erose, truncate; blades 6–30 cm long, 6–10 mm wide, stiff to firm, linear, flat, surfaces smooth or scaberulous, glabrous to pilose, primary veins prominent, margins glabrous, apex acuminate, hardened. Spikes 5–15 cm long, erect, bilateral, packed

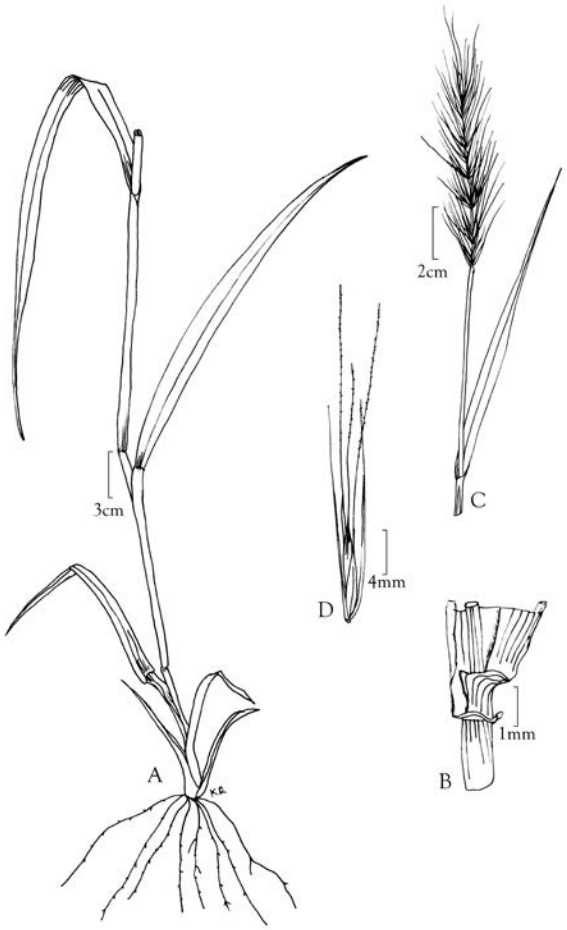

FIGURE 90. *Elymus macgregorii*. A. Base of culm. B. Sheath, ligule, and blade. C. Spike. D. Spikelets. A–C drawn from *Kanal 089* (US-3075148); D modified from Barkworth et al. (2007).

FIGURE 91. *Elymus repens*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 029* (US-3073415); C modified from Barkworth et al. (2007).

broadside to rachis, regular. Spikelets 10–27 mm long, 1 per node or occasionally 2, appressed, elliptic to oblong, laterally compressed; principal lemma awns 0–10 mm long.

84. *Elymus riparius* Wiegand

FIGURE 92

Elymus riparius Wiegand, Rhodora 20(233): 84. 1918.
Common names: eastern riverbank wildrye, streambank wildrye.

Caespitose perennials, rhizomes absent, often somewhat glaucous. Culms 70–160 cm tall, slender, sometimes rooting at the lower nodes. Leaves basal and cauline; sheaths glabrous or scaberulous, auricles absent or to 2 mm long, brown; ligules less than 1 mm long, eciliate membranes, apex erose; blades (5–) 8–15(–25) mm wide, flat, lax, linear, surfaces and margins scabrous, apex acute. Spikes 7–25 cm long, 2–4 cm wide, drooping, bilateral, packed broadside to the rachis. Spikelets 10–20 mm long, 2 per node, elliptic to oblong, laterally compressed; principal lemma awns 20–30(–45) mm long, straight, subterete below.

85. *Elymus villosus* Muhl. ex Willd.

FIGURE 93

Elymus villosus Muhl. ex Willd., Enum. Pl. 1: 131. 1809.
Common names: downy wildrye, hairy wildrye, slender wildrye.

Caespitose perennials, butt sheaths pubescent. Culms 40–130 cm tall, geniculately ascending. Leaves basal and cauline; sheaths pilose, occasionally glabrate, auricles 1–3 mm long; ligules less than 1 mm long, eciliate membranes, apex entire or erose, brownish; blades 10–20 cm long, 4–12 mm wide, linear, flat, surface pubescent, hairy adaxially, margins pubescent or sparsely hairy, apex acute. Spikes 4–12 cm long, 1.5–3.5 cm wide, long exserted, arcuate, bilateral, packed broadside to rachis. Spikelets 7–12 mm long, usually 2 per node, cuneate,

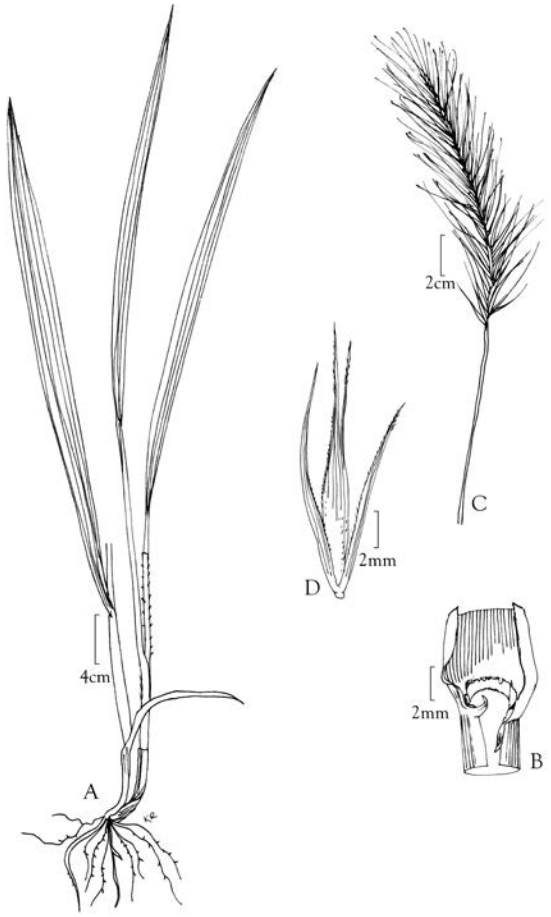

FIGURE 92. *Elymus riparius*. A. Base of culm. B. Sheath, ligule, and blade. C. Spike. D. Spikelet. A–C drawn from *Kanal 183* (US-3279014); D modified from Barkworth et al. (2007).

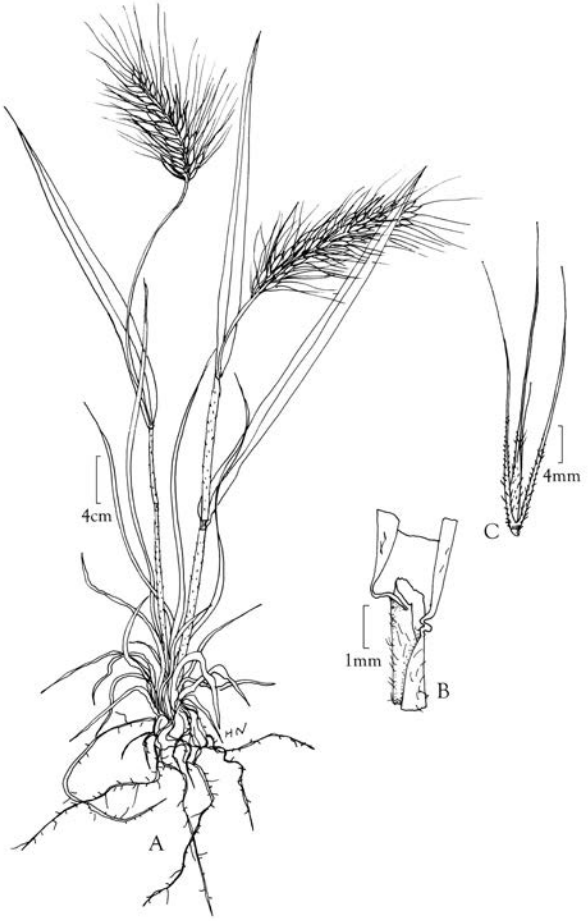

FIGURE 93. *Elymus villosus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Smith 5060* (US-2151140); C modified from Barkworth et al. (2007).

laterally compressed; principal lemma awns 10–30 mm long, straight.

86. *Elymus virginicus* L.

FIGURE 94

Elymus virginicus L., Sp. Pl. 1: 84. 1753.
Common names: Terrell grass, Virginia wildrye grass.

Densely caespitose perennials, sometimes glaucous. Culms 30–130 cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths glabrous, rarely pubescent, auricles falcate; ligules less than 1 mm long, eciliate membranes, truncate; blades 5–15 mm wide, linear, flat, surfaces scabrous, glabrous or pubescent, margins scabrous; apex acute. Spikes (3–)4–16(–22) cm long, 1–2.2(–2.5) cm wide, exserted or embraced at base by subtending leaf, bilateral; spikelet packed broadside to rachis. Spikelets 10–15 mm long, usually 2 per node, elliptic to oblong,

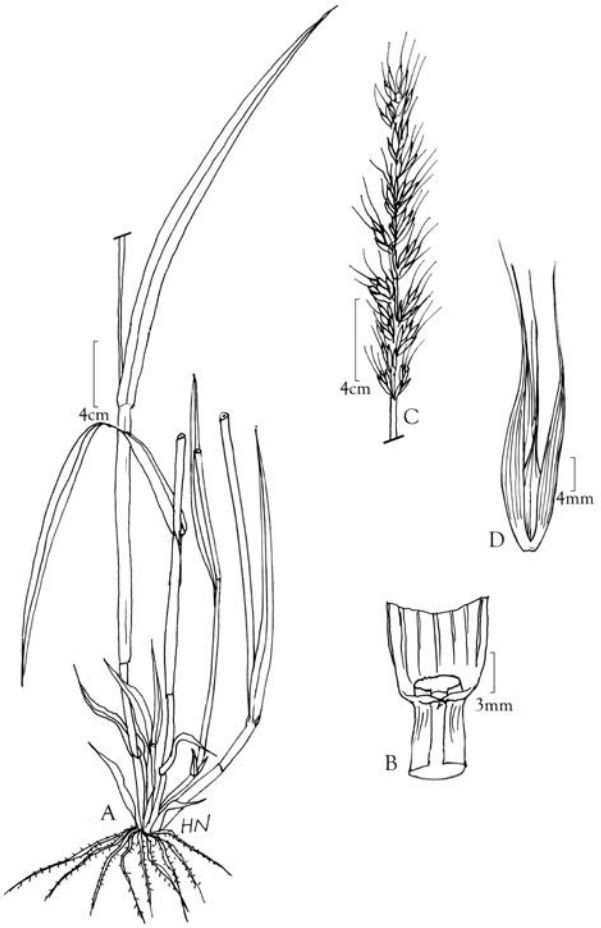

FIGURE 94. *Elymus virginicus*. A. Base of culm. B. Sheath, ligule, and blade. C. Spike. D. Spikelet. A–C drawn from *Kanal 645* (US-3268301); D modified from Barkworth et al. (2007).

laterally compressed; principal lemma awns 5–25 mm long, straight.

87. *Eragrostis capillaris* (L.) Nees

FIGURE 95

Eragrostis capillaris (L.) Nees, Fl. Bras. Enum. Pl. 2(1): 505. 1829.
Common name: lace grass.

Caespitose annuals. Culms (15–)20–50(–60) cm tall, erect or geniculately ascending, glabrous, branched at the base. Leaves mostly basal; sheath surface glabrous, outer margins hairy, oral hairs ciliate; ligules 0.2–0.5 mm long, fringe of hairs; blades (6–)8–20(–30) cm long, 2–5 mm wide, linear, flat or conduplicate, abaxial surfaces smooth, glabrous, adaxial surfaces with tubercle-based hairs, margins glabrous, apex acute. Panicles (10–)15–45(–55) cm long, (7–)10–25 cm wide, open, ovate, diffuse. Spikelets (1.4–)2–5 mm long, 1–1.4 mm wide, 2–5(–7)-flowered,

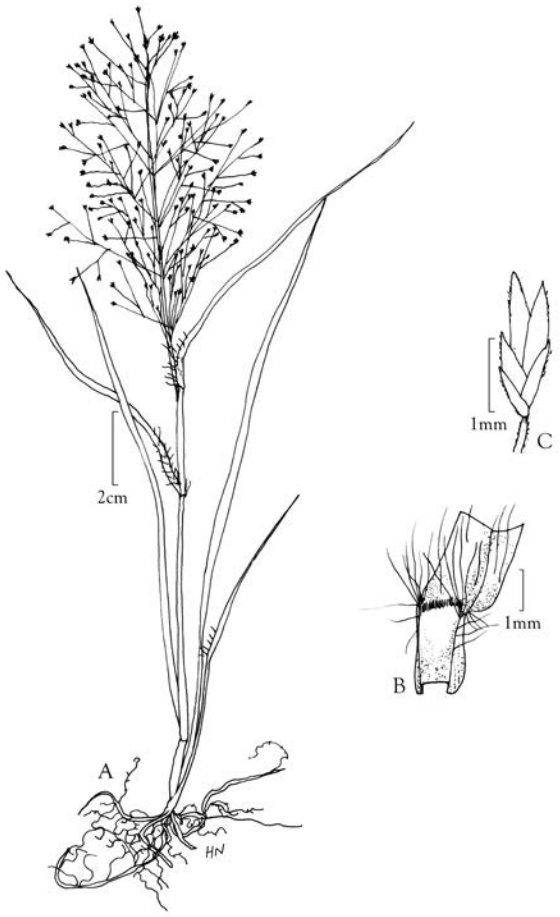

FIGURE 95. *Eragrostis capillaris*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Holm s.n.* (US-2380775); C modified from Barkworth et al. (2003).

lanceolate or ovate, laterally compressed; lemmas awnless. Caryopses 0.4–0.7 mm long, ovoid to rectangular-prismatic, deeply grooved adaxially, striate.

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

FIGURE 96

*Eragrostis cilianensis** (All.) Vignolo ex Janch., Mitt. Naturwiss. Vereins Univ. Wien, n.s., 5: 110. 1907.
Common name: stink grass.

Densely caespitose annuals; sometimes with crateriform glands wartlike below the nodes. Culms 15–45(–65) cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths glabrous, occasionally glandular; ligules 0.4–0.8 mm long, fringe of hairs; blades (1–)5–20 cm long, (1–)3–5(–10) mm wide, linear, flat, surfaces glabrous, sometimes glandular, scaberulous, margins glandular or eglandular. Panicles (3–)5–20 cm long, 2–8.5 cm wide, open or somewhat contracted, ovate, dense or loose; panicle branches stiff, glandular. Spikelets 6–20 mm long, 2–4 mm wide, 10–40-flowered, oblong or ovate, laterally compressed; lemma keels with 1–3 crateriform glands, awnless. Caryopses 0.5–0.7 mm long, globose to broadly ellipsoid, smooth to faintly striate.

89. *Eragrostis frankii* (Fisch., C. A. Mey. & Avé-Lall.) C. A. Mey. ex Steud.

FIGURE 97

Eragrostis frankii (Fisch., C. A. Mey. & Avé-Lall.) C. A. Mey. ex Steud., Syn. Pl. Glumac. 1: 273. 1854.
Common names: Frank's lovegrass, sandbar lovegrass.

Caespitose annuals. Culms 10–50 cm tall, decumbent, erect to geniculate, glabrous, often with glandular pits below the nodes; lateral branches ample. Leaves basal and cauline; sheaths

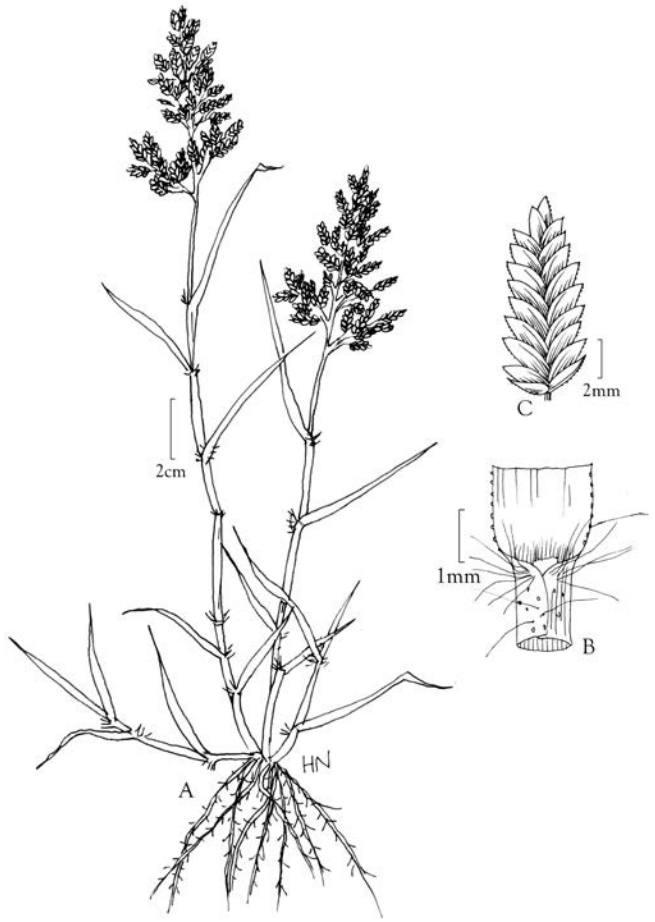

FIGURE 96. *Eragrostis cilianensis*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 670* (US-3205467) and *Kanal 307* (US-3214590); C modified from Barkworth et al. (2003).

FIGURE 97. *Eragrostis frankii*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Kearney 197* (US-640360).

longer than adjacent culm internodes, glabrous, oral hairs ciliate; ligules 0.2–0.5 mm long, fringe of hairs; blades (2–)4–10(–21) cm long, 1–4 mm wide, linear, flat to involute, surfaces scabrous, rough adaxially, glabrous, margins glabrous, apex acute. Panicles 4–20 cm long, less than 1/2 the height of the plants, 2–10(–14) cm wide, open, oblong. Spikelets (1.7–)2–4(–5.6) mm long, 1–2.5 mm wide, 3–6-flowered, lanceolate, laterally compressed; lemmas awnless. Caryopses 0.4–0.7 mm long, ovoid to rectangular-prismatic, striate.

90. *Eragrostis hypnoides* (Lam.) Britton, Sterns & Poggenb.

FIGURE 98

Eragrostis hypnoides (Lam.) Britton, Sterns & Poggenb., Prelim. Cat. 69. 1888.
Common name: teal lovegrass.

Mat-forming annuals, stolons present. Culms (2–)5–12(–20) cm long, decumbent, the erect portion often branched, rooting from lower nodes; internodes glabrous or pubescent; nodes glabrous. Leaves basal and cauline; sheaths glabrous, outer margins pilose; ligules 0.3–0.6 mm long, fringe of hairs; blades 0.5–2.5 cm long, 1–2 mm wide, linear, flat or conduplicate, surfaces puberulous, hairy adaxially, margins glabrous, apex acute. Panicles 1–3.5 cm long, 0.7–2.5 cm wide, open, ovate, terminal and axillary. Spikelets 4–13 mm long, 1–1.5 mm wide, 12–35-flowered, lanceolate, laterally compressed; lemmas awnless. Caryospese 0.3–0.5 mm long, ellipsoid, somewhat translucent.

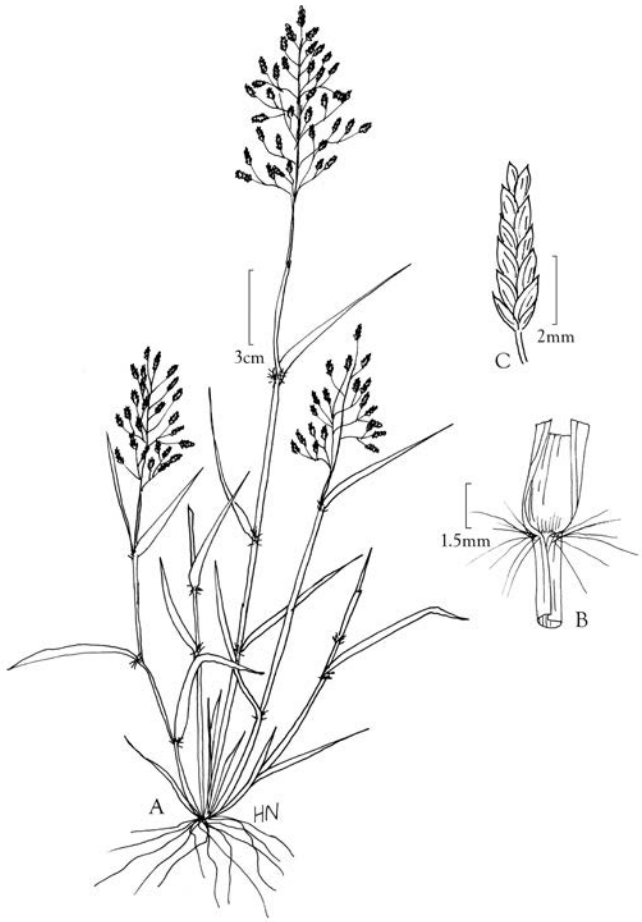

FIGURE 98. *Eragrostis hypnoides*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Leonard 3512* (US-3150974); C modified from Barkworth et al. (2003).

91. *Eragrostis minor** Host

FIGURE 99

*Eragrostis minor** Host, Icon. Descr. Gram. Austriac. 4: 15. 1809.
Common name: little lovegrass.

Caespitose annuals; glands wartlike below the nodes. Culms 10–45 cm tall, geniculately ascending. Leaves cauline; sheath sometimes glandular on midveins, hairy at the apices; ligules 0.2–0.5 mm, fringe of hairs; blades 1.5–10 cm long, 1–3(–4) mm

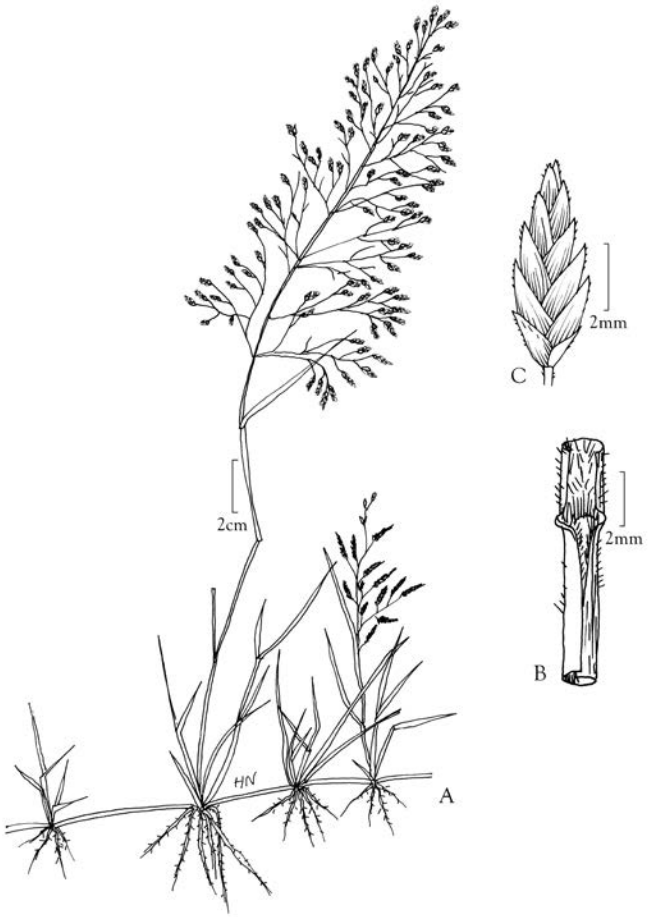

FIGURE 99. *Eragrostis minor*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Baltars 3427* (US-2577113A).

wide, linear, flat, surfaces scabrous, glandular, margins glandular or eglandular, apex acute. Panicles 4–20 cm long, 2.2–8(–10) cm wide, open, ovate, dense or loose; branches stiff, eglandular or glandular. Spikelets 4–7(–11) mm long, 1.1–2.2 mm wide, 7–12(–20)-flowered, oblong, laterally compressed; lemmas occasionally with 1 or 2 crateriform glands, awnless. Caryopses 0.4–0.7 mm long, ellipsoid, striate.

92. *Eragrostis pectinacea* (Michx.) Nees

FIGURE 100

Eragrostis pectinacea (Michx.) Nees, Fl. Afr. Austral. Ill. 406. 1841.

Common names: Carolina lovegrass, pink grass, purple lovegrass.

Densely caespitose annuals; butt sheaths green or purple. Culms 10–50 cm tall, geniculately ascending or decumbent. Leaf sheath glabrous below, hairy at the summit, oral hairs bearded; ligules 0.2–0.5 mm long, fringe of hairs; blades 2–20 cm long, 1–4.5 mm wide, linear, flat to involute, surfaces scaberulous, rough adaxially, margins glabrous, apex acute. Panicles 5–25 cm long, 3–12(–15) cm wide, open, ovate. Spikelets 3.5–11 mm long, 1.2–2.5 mm wide, 6–22-flowered, appressed, laterally compressed; lemmas awnless. Caryopses 0.5–1.1 mm long, pyriform, slightly laterally compressed, surface smooth to faintly striate.

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

FIGURE 101

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

Common name : India lovegrass.

Caespitose annuals. Culms 8–45(–70) cm tall, slender, erect or geniculately ascending. Leaves basal and cauline; sheath mostly glabrous, occasionally glandular; ligules 0.1–0.3 mm, fringe of hairs; blades 2–15(–20) cm long and 1–2.5(–4) mm wide, linear, flat, surfaces and margins glabrous; occasionally

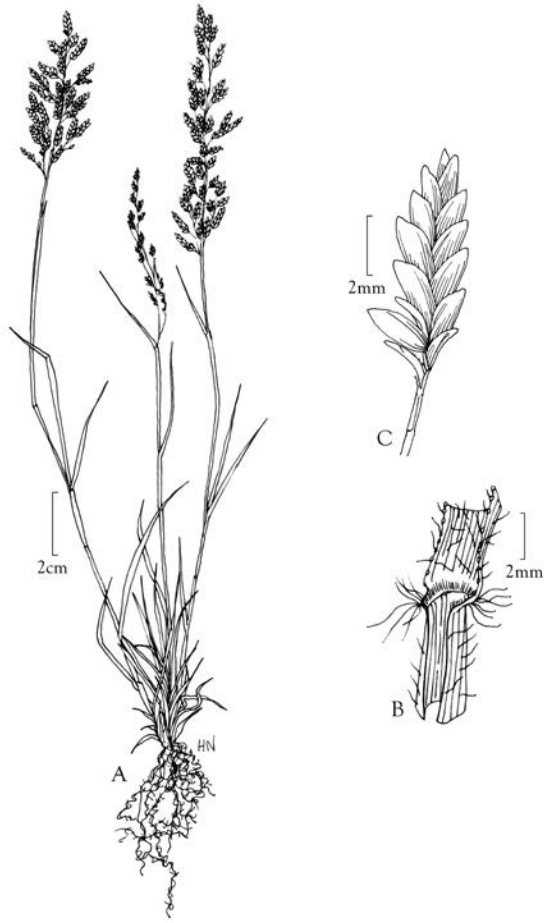

FIGURE 100. *Eragrostis pectinacea*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Fosberg 55104* (US-2681659); C modified from Barkworth et al. (2003).

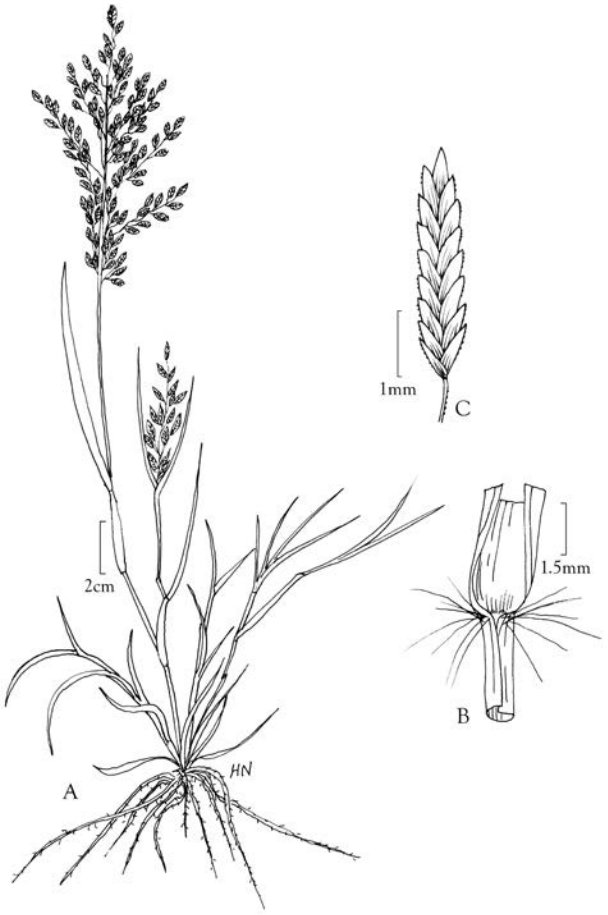

FIGURE 101. *Eragrostis pilosa*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Allard 21862* (US-2236901); C modified from Barkworth et al. (2003).

with glandular pits along midrib, apex acute. Panicles 4–20(–28) cm long, 2–15(–18) cm wide, open, elliptic or ovate; primary panicle branches whorled at lower nodes. Spikelets (2–)3.5–6 (–10) mm long, 0.6–1.4 mm wide, 5–17-flowered, oblong, laterally compressed; lemmas awnless. Caryopses 0.5–1 mm long, obovate to prism shaped, surface smooth to faintly striate.

94. *Eragrostis spectabilis* (Pursh) Steud.

FIGURE 102

Eragrostis spectabilis (Pursh) Steud., Nomencl. Bot. (ed. 2) 1: 564. 1840.

Common names: petticoat-climber, purple lovegrass, trouble-grass, tumble grass.

Caespitose perennials, rhizomes short, knotty. Culms 30–70(–85) cm tall, erect or geniculately ascending. Leaves basal and cauline; sheaths glabrous or pilose, outer margins hairy, oral hairs ciliate; ligules 0.1–0.2 mm long, fringe of hairs; blades 10–32 cm long, 3–8 mm wide, linear, flat or folded, surfaces glabrous or pilose adaxially, margins glabrous, apex acute. Panicles (15–)25–45(–60) cm long, 15–35 cm wide, open, oblong or ovate, diffuse, deciduous as a whole, exserted or embraced at base by subtending leaf. Spikelets 3–7.5 mm long, 1–2 mm wide, 6–12-flowered, oblong, laterally compressed; lemmas awnless. Caryopses 0.6–0.8 mm long, ellipsoid, strongly flattened.

95. *Erianthus giganteus* (Walter) P. Beauv.

FIGURE 103

Erianthus giganteus (Walter) P. Beauv., Ess. Agrostogr. 14, 151, 177. 1812. [Syn. *Saccharum giganteum* (Walter) Pers.]

Common names: giant plume grass, sugarcane plume grass.

Caespitose perennials; rhizomatous, rootstock evident. Culms 130–250 cm tall, erect, robust; nodes bearded. Leaves cauline;

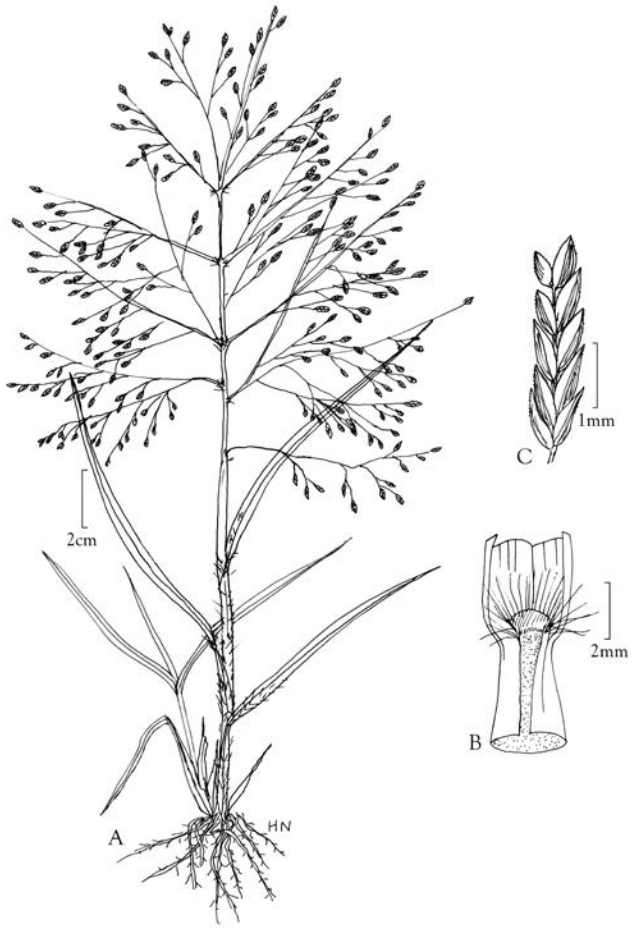

FIGURE 102. *Eragrostis spectabilis*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Oakland s.n.* (US-2382837); C modified from Barkworth et al. (2003).

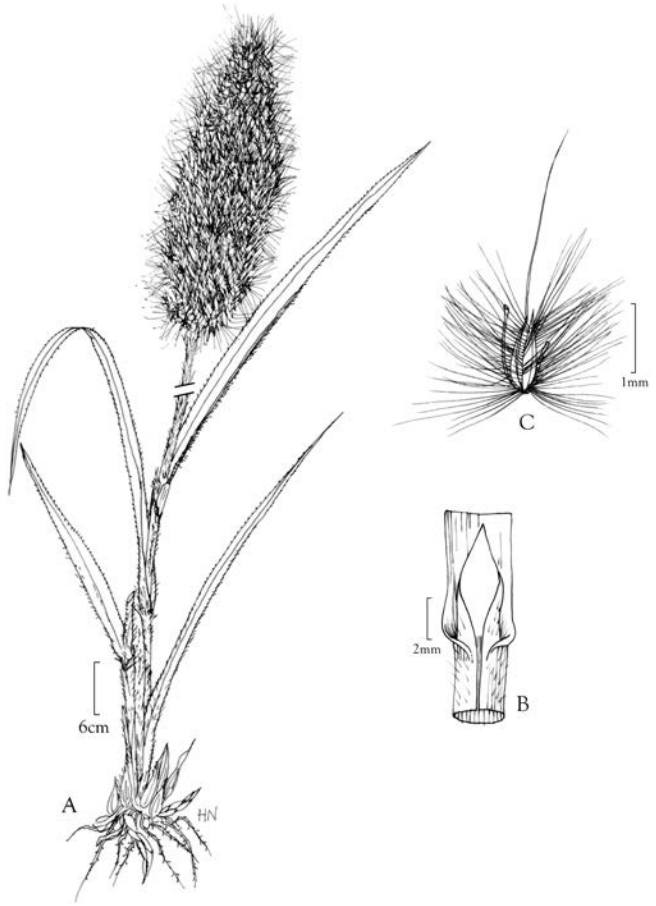

FIGURE 103. *Erianthus giganteus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Pollard 597* (US-260003); C modified from Barkworth et al. (2003).

sheaths glabrate or glabrous, oral hairs bearded; ligules 2–6 mm long, ciliolate membranes; blades 35–70 cm long, 8–30 mm wide, linear, flat, surfaces glabrous or hispid on both sides, margins scabrous, apex acute. Panicles 15–50 cm long, 6–15 cm wide, open, oblong, dense. Spikelets 6–8 mm long, in pairs; fertile spikelets sessile, lanceolate, dorsally compressed; callus hairs 6–10(–20) mm long, longer than the spikelets; principal lemma awns 12–26 mm long, straight or curved, subterete below; anthers 2.

96. *Eriochloa contracta** Hitchc.

FIGURE 104

*Eriochloa contracta** Hitchc., Proc. Biol. Soc. Wash. 4: 163. 1928
Common name: prairie cupgrass.

Caespitose annuals. Culms 20–100 cm tall, erect or geniculately ascending, sometimes branching rooting at the lower nodes; internodes sparingly pilose; pubescent to puberulent. Leaves basal and cauline; sheaths sparsely to densely pubescent; ligules 0.4–1.1 mm long, fringe of hairs; blades 6–12(–22) cm long, 2–8 mm wide, linear, flat, folded to convolute, surfaces sparsely to densely pubescent, margins pubescent, apex attenuate. Panicles 6–20 cm long, 0.3–1.2 cm wide; dense, somewhat contracted, erect. Spikelets (3.1–)3.5–4.5(–5) mm long, lanceolate, dorsally compressed; lower glumes fused with the glabrous callus to form a cuplike structure; upper lemmas 2–2.5 mm long, indurate, elliptic, 5–7-veined, apex acute to obtuse, mucronate to short-awned, the awns 0.4–1.1 mm long.

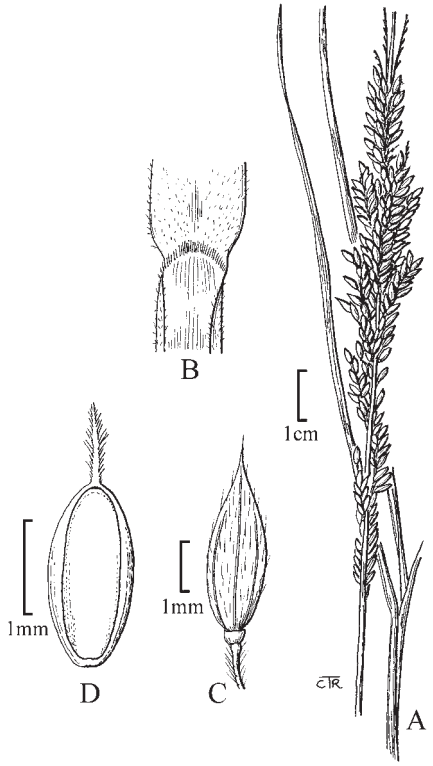

FIGURE 104. *Eriochloa contracta*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. D. Upper floret. Modified from Barkworth et al. (2003).

97. *Festuca filiformis** Pourr.

FIGURE 105

*Festuca filiformis** Pourr., Hist. & Mém. Acad. Roy. Sci. Toulouse 3: 319. 1788.
Common names: fine-leaved sheep fescue, hair fescue.

Densely caespitose perennials. Culms 18–40(–60) cm tall, erect, mostly scabrous or puberulent below the inflorescence. Leaves basal and cauline; sheaths 0.5 mm long, closed for less than 1/3 their length, glabrous or finely puberulent, auricles erect; collars glabrous; ligules 0.1–0.4 mm long, eciliate membrane,

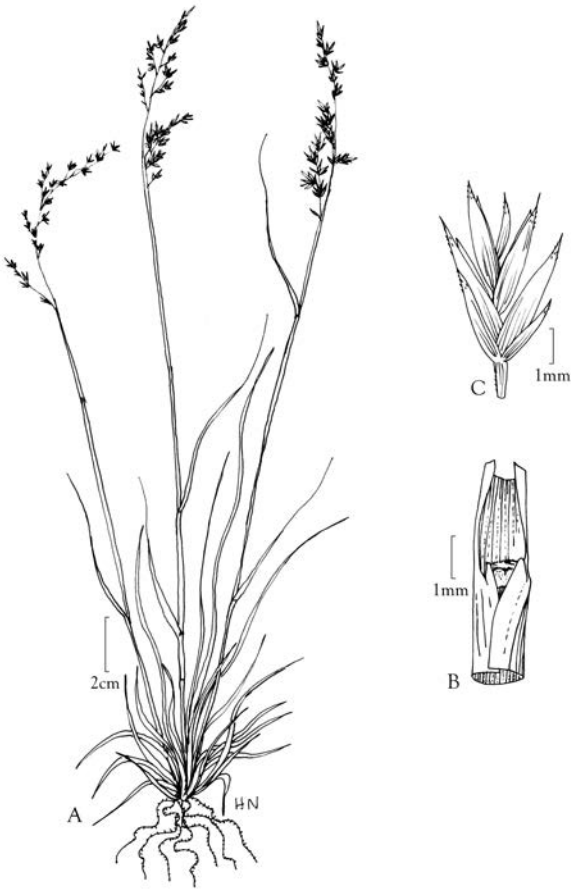

FIGURE 105. *Festuca filiformis*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Fleming 494* (US-3117631); C modified from Barkworth et al. (2007).

apex truncate; blades 0.2–0.4(–0.6) mm in diameter, flat, conduplicate, surface smooth or scabrous, margins glabrous, apex obtuse or acute. Panicles 1–6(–14) cm long, contracted, linear or lanceolate or oblong. Spikelets 3–6(–6.5) mm long, oblong, laterally compressed; lemma awnless, sometimes mucronate.

98. *Festuca myuros** L.

FIGURE 106

Festuca myuros* L., Sp. Pl. 1: 74–75. 1753. [Syn. *Vulpia myuros* (L.) C.C. Gmel.]

Common names: rat-tail fescue, rat-tail six-weeks grass.

Solitary or caespitose annuals. Culms 10–70 cm tall, erect or decumbent, branched or unbranched. Leaves mostly basal; sheaths smooth, glabrous; ligules 0.3–0.5 mm long, eciliate membrane, apex truncate; blades 2–10(–17) cm long, 0.5–3 mm wide, linear, flat or involute, firm or flaccid, usually glabrous, sometimes hairy adaxially, margins scaberulous, apex attenuate. Panicles 3–25 cm long, 0.5–1.5(–2) cm wide, contracted, linear, nodding, curved. Spikelets 5–12 mm long, oblong or cuneate, laterally compressed, exserted or embraced at base by subtending leaf; lower glumes 1/5–1/2 the length of the upper glumes; principal lemma awns 5–15 mm long.

99. *Festuca octoflora* Walter

FIGURE 107

Festuca octoflora Walter, Fl. Carol. 81. 1788. [Syn. *Vulpia octoflora* (Walter) Rydb.]

Common names: eight-flowered six-weeks grass, six-weeks fescue, six-weeks grass.

Solitary or loosely caespitose annuals. Culms 5–60 cm tall, geniculately ascending or decumbent, glabrous. Leaves mostly basal; sheaths glabrous or pubescent; ligules 0.5–1 mm long,

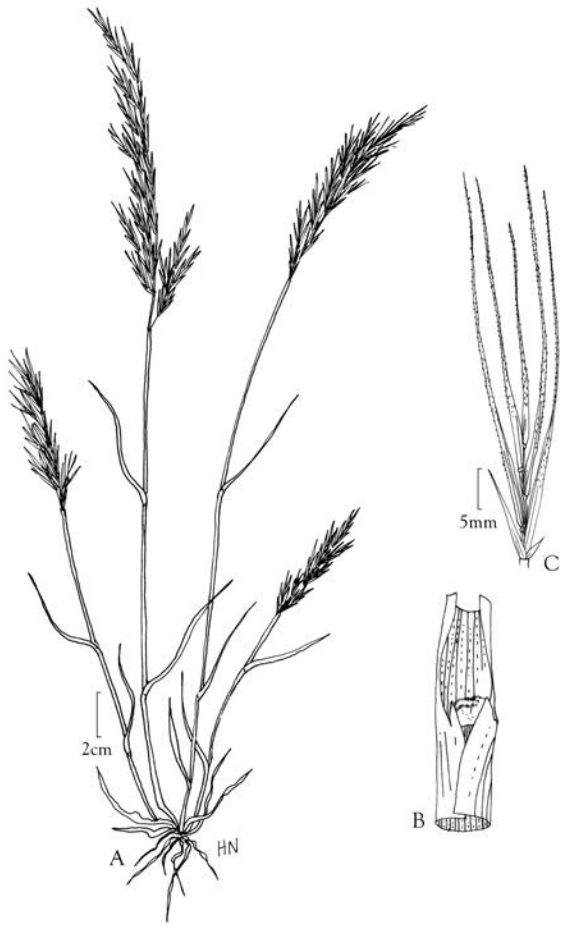

FIGURE 106. *Festuca myuros*. A. Base of culm. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Hermann 10533* (US-2146187); C modified from Hitchcock (1951).

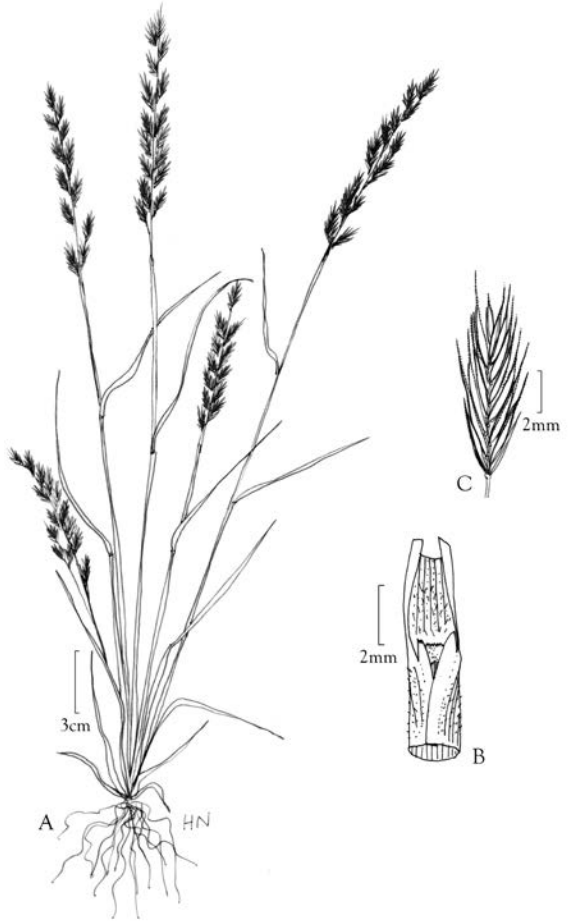

FIGURE 107. *Festuca octoflora*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Kanal 620* (US-3205491) and *Smith 5049* (US-2151137).

eciliate membranes, apex truncate, sometimes ovate; blades 2–10 cm long, 0.5–1 mm wide, linear, flat or involute, glabrous or pubescent. Panicles 1–20 cm long, 0.5–1.5 cm wide, contracted, linear, nodding. Spikelets 4–10(–13) mm long, oblong, laterally compressed; lower glumes 1/2–2/3 the length of the upper glumes; principal lemma awns 0.3–6 mm long.

100. *Festuca paradoxa* Desv.

FIGURE 108

Festuca paradoxa Desv., Mém. Soc. Agric. Angers 1: 209. 1831.
Common name: clustered fescue.

Loosely caespitose perennials. Culms 50–120 cm tall, geniculately ascending. Leaves basal and cauline; sheaths glabrous on surface, closed for less 1/3 their length; ligules (0.2–)0.5–1.5 mm long, eciliate membranes; blades 2–8 mm wide, linear, flat or loosely convolute, surfaces smooth or scabrous, margins scabrous, apex acute. Panicles 12–20 cm long, open, ovate. Spikelets 4–7(–7.5) mm long, clustered toward branch tips, oblong, laterally compressed; lemmas awnless.

101. *Festuca rubra* L.

FIGURE 109

Festuca rubra L., Sp. Pl. 1: 74. 1753.
Common name: red fescue.

Loosely caespitose perennials; rhizomes absent or elongated; basal innovations extravaginal or intravaginal. Culms (8–)10–120(–130) cm tall, erect or geniculately ascending, sometimes single and widely spaced. Leaves basal and cauline; sheaths tubular for about 3/4 of their length, without keel, glabrous or pubescent, lowest sheaths brown or reddish, fibrous; ligules 0.1–0.5 mm long, eciliate membranes, apex truncate; blades 0.3–2.5 mm in diameter, 1.5–7 mm wide, filiform, conduplicate or convolute,

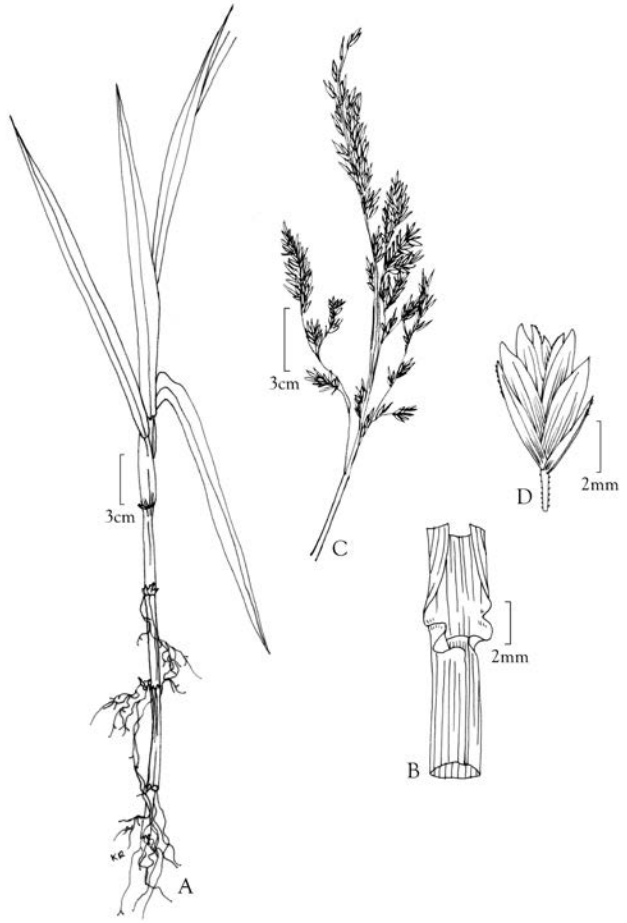

FIGURE 108. *Festuca paradoxa*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Steury 020626.1* (US-3433353); D modified from Barkworth et al. (2007).

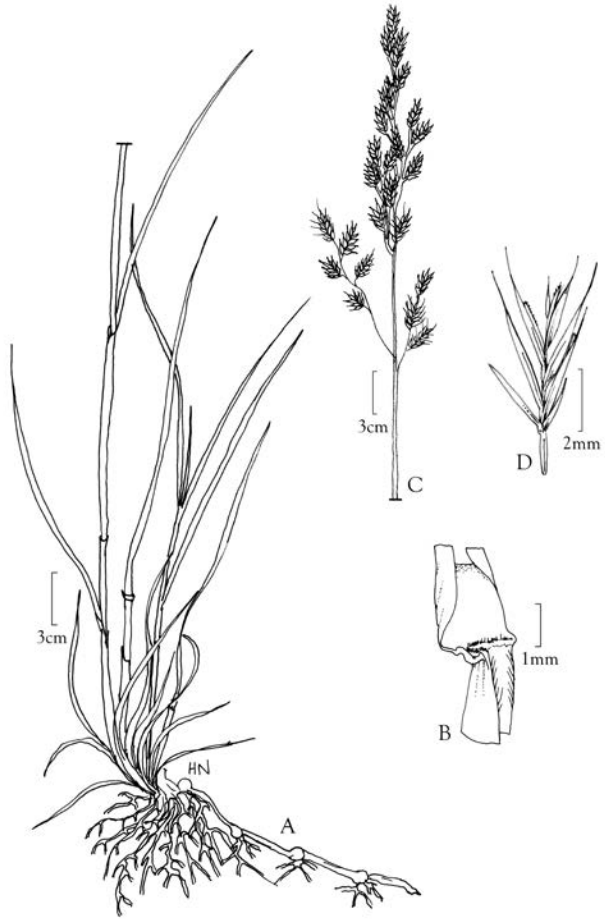

FIGURE 109. *Festuca rubra*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kearney 92* (US-986738); D modified from Barkworth et al. (2007).

sometimes flat and stiff, surfaces smooth or scabrous, glabrous, margins scabrous, apex obtuse or abruptly acute. Panicles 3–20 cm long, open or contracted, lanceolate or oblong. Spikelets (6–)7–17 mm long, elliptic or oblong, laterally compressed; principal lemma awns 0.5–3 mm long.

102. *Festuca subverticillata* (Pers.) E. B. Alexeev

FIGURE 110

Festuca subverticillata (Pers.) E. B. Alexeev, Novosti Sist. Vyssh. Rast. 17: 52. 1980.
Common name: nodding fescue.

Solitary or caespitose perennials. Culms (40–)50–100(–150) cm tall, glabrous, erect or decumbent at the base; basal innovations usually extravaginal. Leaves basal and cauline; sheaths glabrous on surface or hirsute, closed for less than 1/3 their length; ligules (0.2–)0.5–1(–2) mm long, eciliate membranes, apex erose; blades (3–)5–10 mm wide, linear, flat, or loosely convolute, surfaces glabrous or pubescent, sparsely hairy, hairy adaxially, margins glabrous, apex acute. Panicles 13–25 cm long, open, ovate, diffuse. Spikelets 4–5(–7) mm long, elliptic, laterally compressed; lemmas awnless.

103. *Festuca trachyphylla** (Hack.) Krajina

FIGURE 111

*Festuca trachyphylla** (Hack.) Krajina, Acta Bot. Bohem. 9: 190. 1930.
Common names: hard fescue, sheep fescue.

Densely caespitose perennials; butt sheaths persistent and investing base of culm, with compacted dead sheaths, fibrous; basal innovations intravaginal. Culms (15–)20–75 cm tall; internodes glabrous or with spare hairs. Leaves mostly basal; sheaths closed for less than 1/3 their length, with persistent margins, not becoming fibrous, pubescent, auricles erect, obtuse; collars

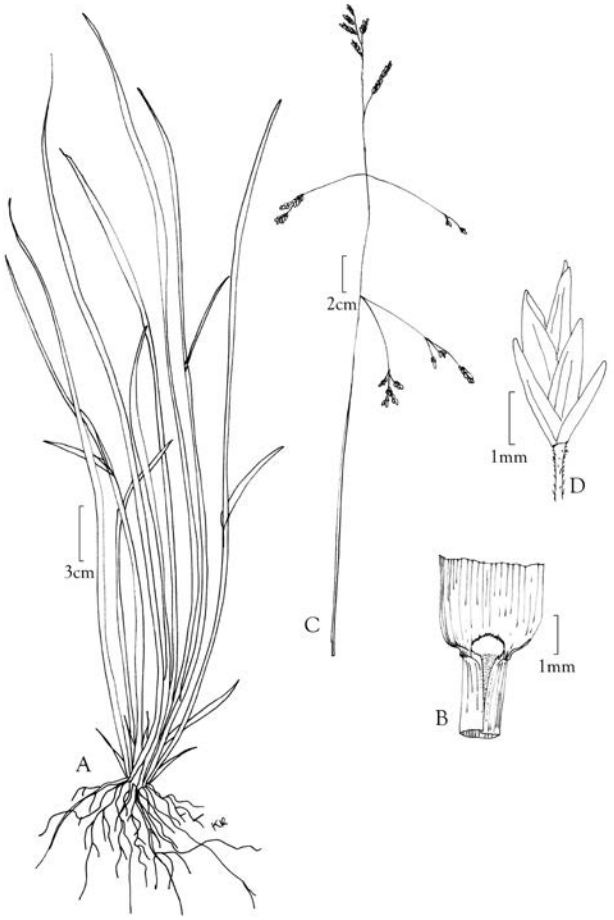

FIGURE 110. *Festuca subverticillata*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Fosberg 65463* (US-3343452); D modified from Barkworth et al. (2007).

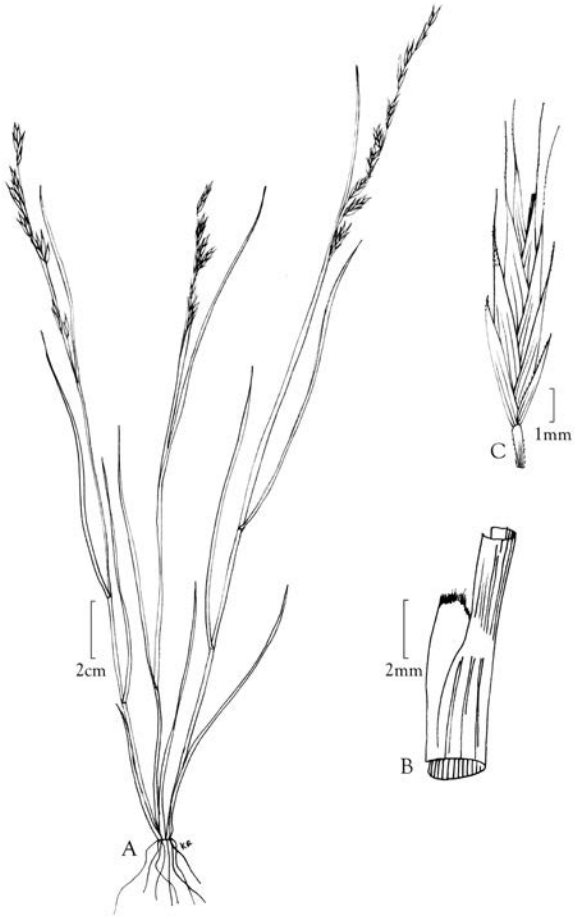

FIGURE 111. *Festuca trachyphylla*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Fleming 300* (US-3117582); C modified from Barkworth et al. (2007).

glabrous; ligules 0.1–0.5 mm long, eciliate membranes, apex obtuse; blades (0.5–)0.8–1.2 mm wide, conduplicate, rarely flat, elliptic in section, surfaces scabrous, glabrous or pubescent, hairy on both sides, margins glabrous, apex acute. Panicles 4.5–13 cm long, open, interrupted. Spikelets 5–9 mm long, oblong, laterally compressed; principal lemma awns (0.5–)2–2.5 mm long.

104. *Glyceria canadensis* (Michx.) Trin.

FIGURE 112

Glyceria canadensis (Michx.) Trin., Mém. Acad. Imp. Sci. St.-Pétersbourg, Sér. 6, Sci. Math. 1(4): 366. 1830.
Common names: rattlesnake grass, rattlesnake manna grass.

Solitary or caespitose perennials with short rhizomes. Culms 60–150 cm tall, thick, erect or bases decumbent; internodes smooth or scaberulous. Leaves basal and cauline; sheaths scaberulous; ligules 0.5–6 mm long, eciliate membranes, apex lacerate; blades 8–40(–60) cm long, 3–8(–10) mm wide, linear, flat, surfaces scabrous, rough adaxially, margins scabrous, apex acute. Panicles 10–40 cm long, 8–20 cm wide, open, ovate; primary branches spreading to drooping. Spikelets 5–8 mm long, (4–)5–10-flowered, ovate, laterally compressed; lemmas 2.4–4 mm long, projecting conspicuously beyond the palea, awnless.

105. *Glyceria laxa* (Scribn.) Scribn.

FIGURE 113

Glyceria laxa (Scribn.) Scribn., Fl. Mt. Desert Isl. 180. 1894. [Syn. *Glyceria canadensis* var. *laxa* (Scribn.) Hitchc.]
Common names: lax manna grass, lax rattlesnake manna grass, limp manna grass.

Solitary or caespitose perennials with short rhizomes; butt sheaths sparsely hairy. Culms 60–160 cm tall, erect; internodes smooth or scaberulous. Leaves basal and cauline; sheaths scaberulous; ligules 1–6 mm long, eciliate membranes, apex erose; blades 8–40(–60) cm long, 3–8(–10) wide, linear, flat, surface scabrous,

FIGURE 112. *Glyceria canadensis*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Steele s.n.* (US-279330); D modified from Barkworth et al. (2007).

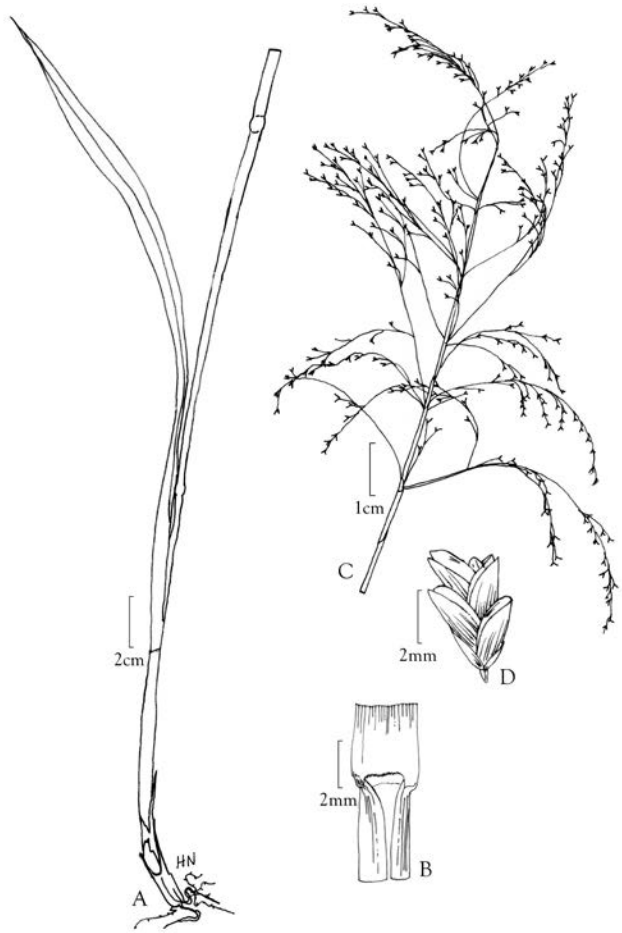

FIGURE 113. *Glyceria laxa*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Leonard 21203* (US-2378644); D modified from Barkworth et al. (2007).

rough adaxially, margins scabrous, apex acute. Panicles 15–40 cm long, 8–18 cm wide, ovate; primary branches drooping. Spikelets 3–5 mm long, 2–5-flowered, ovate, laterally compressed; lemmas 1.8–2.5 mm long, about as long as the palea, awnless.

106. *Glyceria septentrionalis* Hitchc.

FIGURE 114

Glyceria septentrionalis Hitchc., Rhodora 8(95): 211. 1906.
Common names: floating manna grass, northern manna grass.

Caespitose perennials. Culms 73–182 cm tall, to 8 mm thick; rooting from lower nodes. Leaves basal and cauline; sheaths tubular for much of their length, keeled or strongly compressed, glabrous; ligules 5–16 mm long, eciliate membrane, apex acuminate; blades 18–32 cm long, 2–15 mm wide, linear, flat, abaxial surfaces scabrous, adaxial surfaces scaberulous, margins glabrous, apex acute. Panicles 15–60 cm long, 1–3.5 cm wide, open, lanceolate; primary branches equilateral spreading or nodding. Spikelets (6.5–)10–23 mm long, 8–16-flowered, linear, laterally compressed, compressed slightly; lemmas 2.4–4.8 mm long, awnless.

107. *Glyceria striata* (Lam.) Hitchc.

FIGURE 115

Glyceria striata (Lam.) Hitchc., Proc. Biol. Soc. Wash. 41: 157. 1928.
Common names: fowl manna grass, nerved manna grass, ridged glyceria.

Caespitose perennials, rhizomes absent or short. Culms 20–80(–100) cm tall, erect. Leaves basal and cauline; sheaths tubular for much of their length, smooth, glabrous, keeled, sometimes weakly so; ligules 1.5–4 mm long, eciliate membranes, apex usually rounded, sometimes acute to mucronate, erose-lacerate; blades 12–30 cm long, 2–8 mm wide, linear, flat or conduplicate,

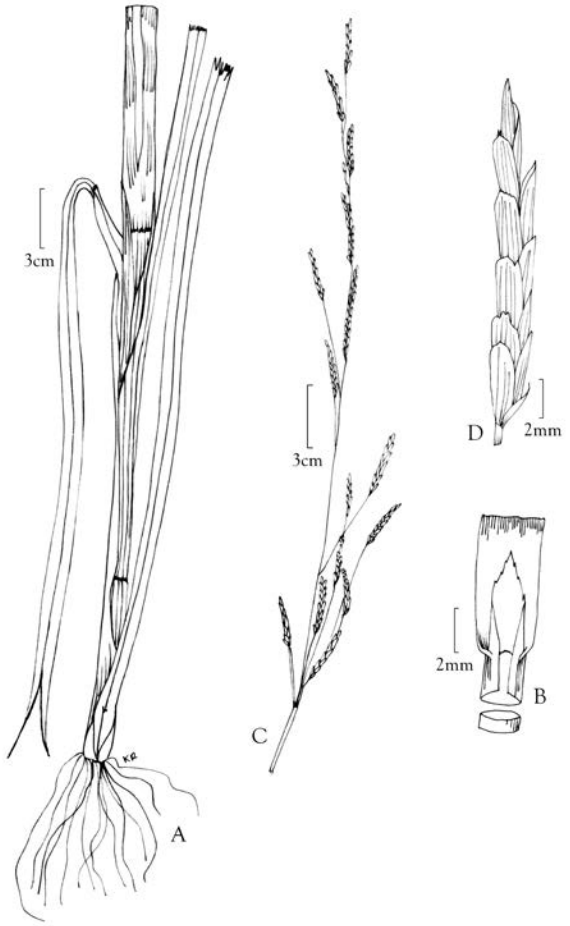

FIGURE 114. *Glyceria septentrionalis*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Hitchcock 12927* (US-1063142); D modified from Barkworth et al. (2007).

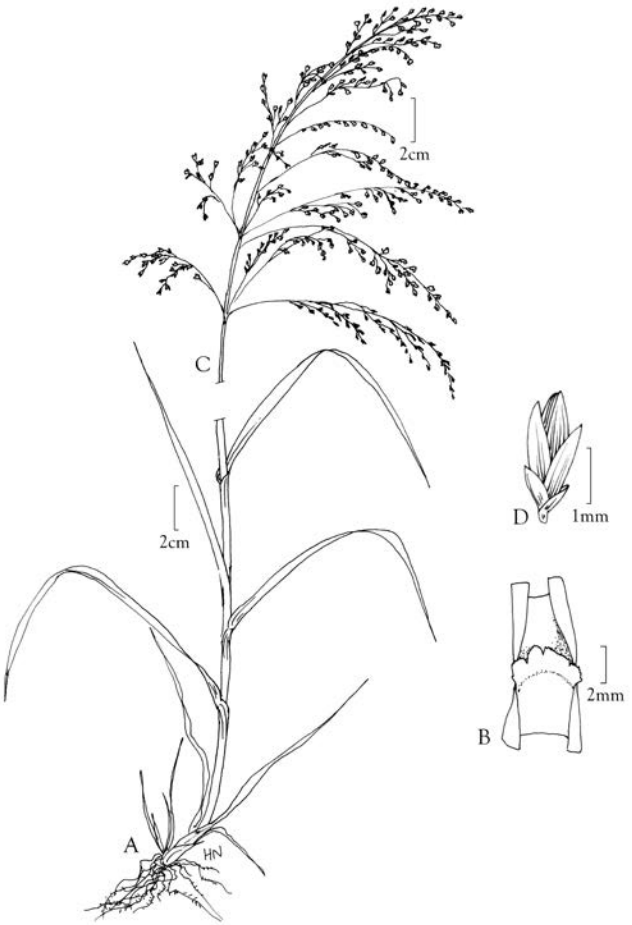

FIGURE 115. *Glyceria striata*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Strong 2381* (US-3409634); D modified from Barkworth et al. (2007).

surfaces smooth, glabrous, margins glabrous, apex acute. Panicles 6–25 cm long, 2.5–21 cm wide, open, ovate to pyramidal; primary branches nodding. Spikelets 1.8–4 mm long, 1.2–2.9 mm wide, 3–7-flowered, oblong or ovate, laterally compressed; lemmas 1.2–2 mm long, awnless.

108. *Gymnopogon ambiguus* (Michx.) Britton, Sterns & Poggenb.

FIGURE 116

Gymnopogon ambiguus (Michx.) Britton, Sterns & Poggenb., Prelim. Cat. 69. 1888.
Common names: beard grass, bearded skeleton grass.

Caespitose perennials; rhizomes short, with a knotty base; butt sheath glabrous. Culms 20–100 cm tall, erect or geniculately ascending, sparingly branched. Leaves distichous, basal and cauline; sheaths overlapping, glabrous; collars conspicuously pubescent; ligules 0.2 mm long, ciliate membrane; blades (1.5–)2.5–12 cm long, (2–)5–10(–18) mm wide, bases broadly rounded, linear-lanceolate, flat or conduplicate, stiff or firm, surfaces mostly glabrous, margins glabrous, apex acute. Panicles (6–)11.5–30(–35) cm long; primary branches 7–24 cm long, borne along a central axis, spreading or deflexed, straight, unilateral. Spikelets 4.1–6.9 mm long, appressed, lanceolate, laterally compressed, packed broadside to the rachis; principal lemma awns 4–12.2 mm long, subapical, flexuous.

109. *Holcus lanatus** L.

FIGURE 117

*Holcus lanatus** L., Sp. Pl. 2: 1048. 1753.
Common names: common velvet grass, Yorkshire fog.

Caespitose perennials; butt sheaths pubescent. Culms 20–100 cm tall, grayish, erect or geniculately ascending; lower

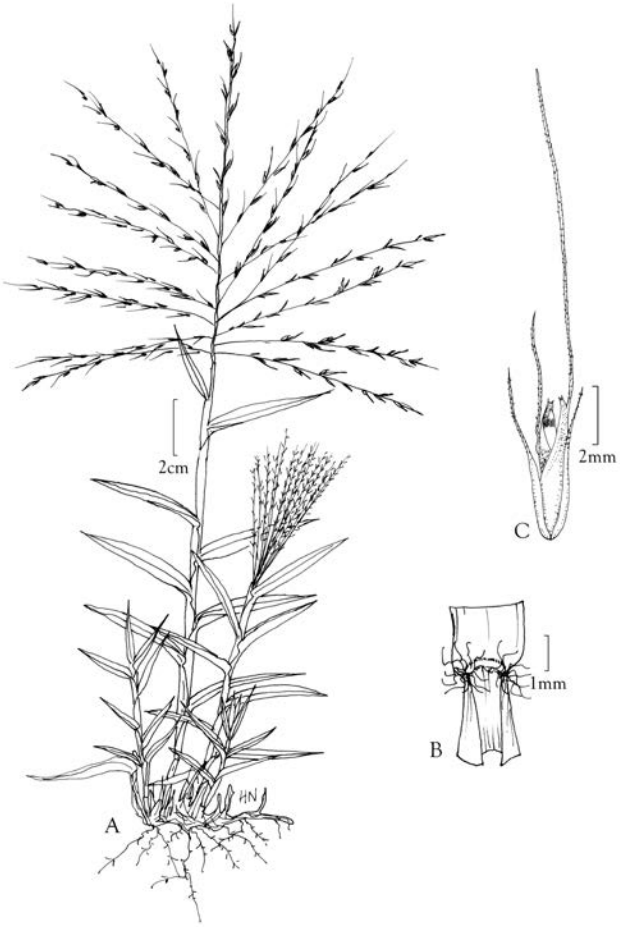

FIGURE 116. *Gymnopogon ambiguus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Swallen s.n.* (US-1646134); C modified from Barkworth et al. (2003).

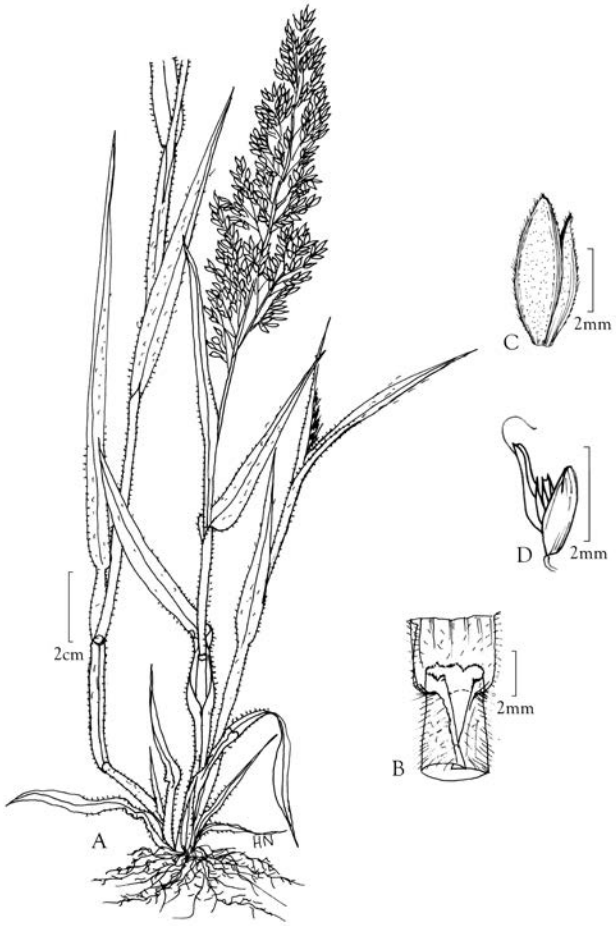

FIGURE 117. *Holcus lanatus*. A. Habit. B. Sheath, ligule, and blade. C. Glumes. D. Florets. A, B drawn from *Leonard 20965* (US-2164473); C, D modified from Barkworth et al. (2007).

internodes densely pilose, upper internodes often glabrous; nodes pubescent. Leaves mostly basal; sheaths densely pubescent, with reflexed hairs; ligules 1–4 mm long, eciliate membrane, apex truncate, erose-ciliolate; blades 4–20 cm long, (3–)5–10 mm wide, green or gray green, linear, flat, surfaces densely pubescent, soft pubescent on both sides, margins pubescent, apex acute. Panicles 3–15(–20) cm long, 1–8 cm wide, open, lanceolate or oblong or ovate, dense or loose. Spikelets 3–6 mm long, elliptic, laterally compressed; apical sterile lemma awns 1–2 mm long (enclosed by glumes), subapical, twisted and forming a hook.

110. *Hordeum jubatum* L.

FIGURE 118

Hordeum jubatum L., Sp. Pl. 1: 85. 1753.
Common names: foxtail grass, squirrel-tail grass.

Densely caespitose perennials, short-lived, sometimes appearing annuals. Culms 20–80 cm tall, erect or geniculately ascending; nodes brown, glabrous. Leaves basal and cauline; sheaths glabrous or pubescent; ligules 0.2–0.8 mm long, eciliate membranes, apex truncate; blades 6–15 cm long, 2–5 mm wide, linear, flat, surface scabrous, sometimes pubescent, margins scabrous, apex acute. Spikes 3–15 cm long, 4–6 mm wide, linear, bilateral. Spikelets 4–7 mm long, 3 per node, packed broadside to the rachis, lanceolate, dorsally compressed; lemmas 4–8.5 mm long, awns 2–15 mm long, straight to divergent, ascending.

111. *Hordeum murinum** L.

FIGURE 119

*Hordeum murinum** L., Sp. Pl. 1: 85. 1753.
Common name: wall barley.

Caespitose annuals. Culms 6–60 cm tall, erect. Leaves basal and cauline; basal sheaths somewhat hairy; auricles to 8 mm long, falcate; ligules 1–4 mm long, eciliate membranes, apex erose; blades to 28 cm long, 2–8 mm wide, linear, flat, surfaces

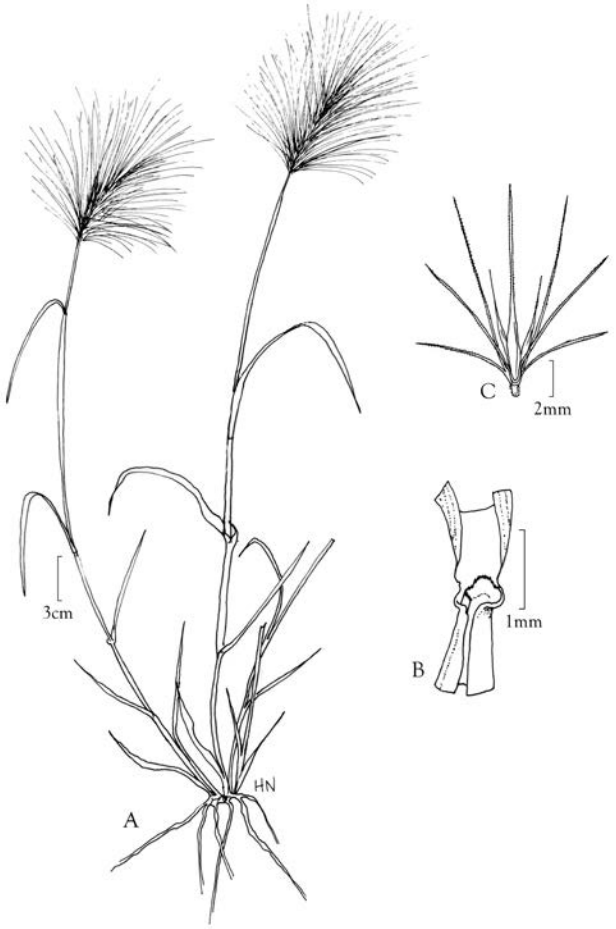

FIGURE 118. *Hordeum jubatum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Ward s.n.* (US-1885285); C modified from Barkworth et al. (2007).

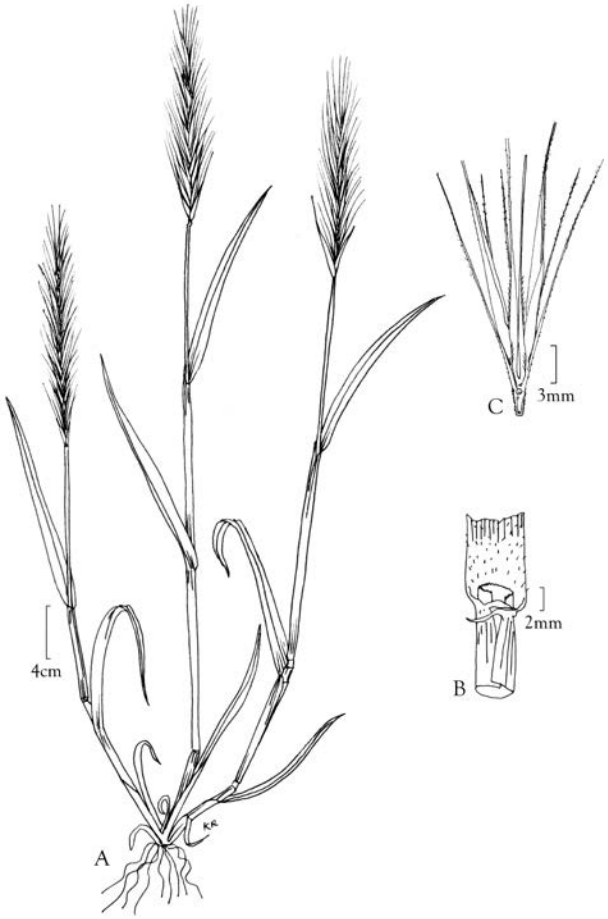

FIGURE 119. *Hordeum murinum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Reed s.n.* (US-3049731); C modified from Barkworth et al. (2007).

and margins sparsely hairy, apex acute. Spikes 3–8 cm long, 7–16 mm wide, linear or oblong, bilateral; rachis internodes oblong. Spikelets 7–12 mm long, 3 per node, packed broadside to the rachis, lanceolate, dorsally compressed; lemmas 8–14 mm long, awns 20–40 mm long.

112. *Hordeum pusillum* Nutt.

FIGURE 120

Hordeum pusillum Nutt., Gen. N. Amer. Pl. 1: 87. 1818.
Common name: little barley.

Caespitose annuals. Culms 10–60 cm tall, geniculately ascending; nodes brown, glabrous. Leaves basal and cauline; sheaths scabrous or pubescent; auricles absent or falcate; ligules 0.2–0.8 mm long, eciliate membrane, apex truncate; blades to 10.5 cm long, to 4.5 mm wide, surfaces sparsely to densely pubescent on both sides, linear, flat, margins glabrous or sparsely hairy, apex acute. Spikes 2–9 cm long, 4–8 mm wide, linear, bilateral. Spikelets 4–6 mm long, 3 per node, packed broadside to the rachis, lanceolate, dorsally compressed; lemmas 5–8.5 mm long, awns 3.5–9.5 mm long.

113. *Hordeum vulgare** L.

FIGURE 121

Hordeum vulgare* L., Sp. Pl. 1: 84–85. 1753.
Common name: barley.

Caespitose annuals. Culms to 100(–150) cm tall, erect. Leaves basal and cauline; lower sheaths pilose, upper sheaths glabrous; auricles to 6 mm long, falcate; ligules 1–2 mm long, eciliate membranes, apex truncate; blades 10–30 cm long, 6–15 mm wide, linear, flat, surfaces scabrous, sometimes glabrous, margins glabrous, apex acute. Spikes 5–10 cm long, bilateral. Spikelets 10–15 mm long, 3 per node, packed broadside to the

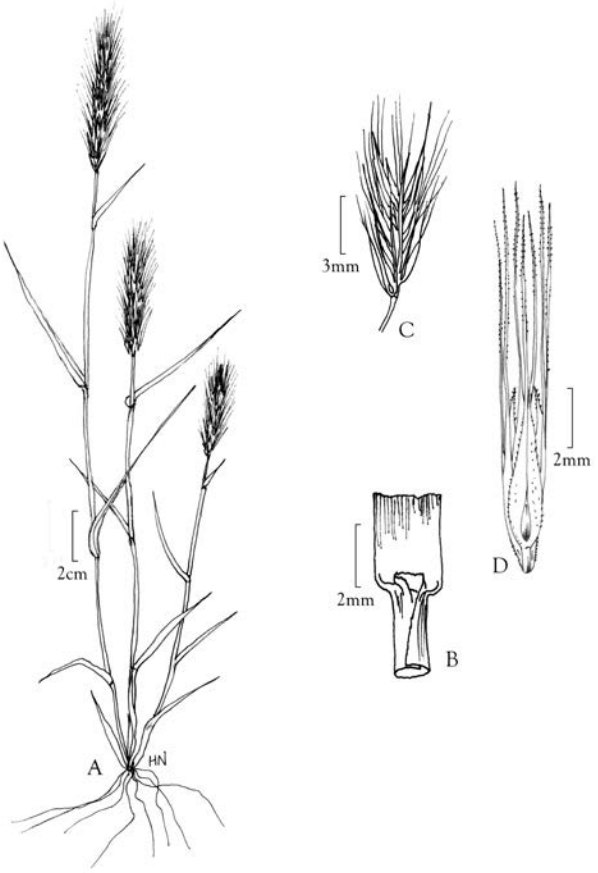

FIGURE 120. *Hordeum pusillum*. A. Habit. B. Sheath, ligule, and blade. C. Portion of the spike. D. Spikelets. A–C drawn from *Herman 10327* (US-2479306); D modified from Barkworth et al. (2007).

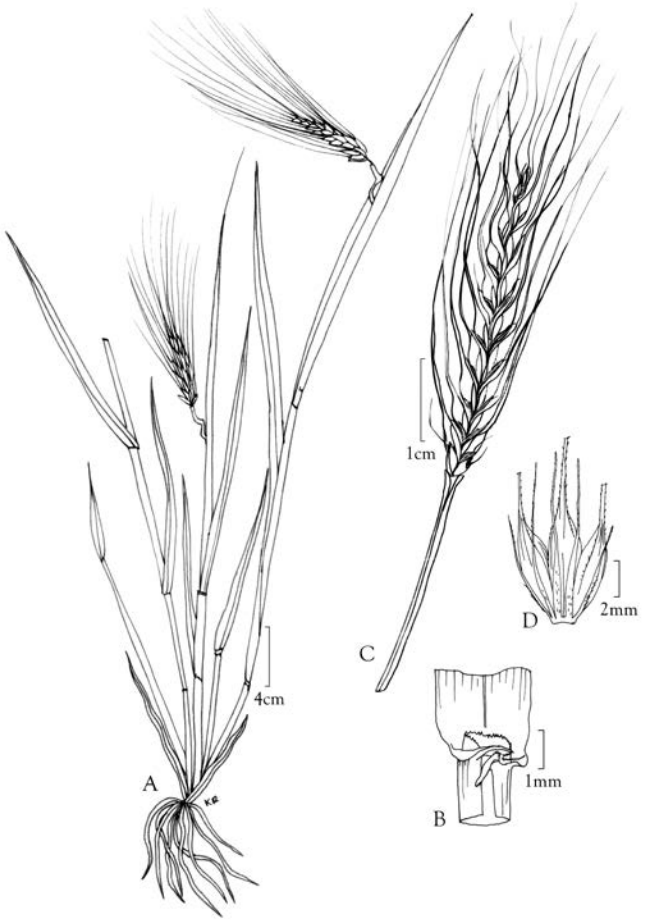

FIGURE 121. *Hordeum vulgare*. A. Habit. B. Sheath, ligule, and blade. C. Spike. D. Spikelets. A–C drawn from *Fleming 795* (US-3193000) and *Steele s.n.* (US-364260); D modified from Barkworth et al. (2007).

rachis, cuneate, dorsally compressed; lemmas 6–12 mm long, awns 6–15 mm long, straight, scabrous.

114. *Leersia oryzoides* (L.) Sw.

FIGURE 122

Leersia oryzoides (L.) Sw., Prodr. 21. 1788.
Common name: rice cut grass.

Caespitose perennials; rhizomes elongated, not scaly. Culms 35–150 cm long, erect or geniculately ascending, branching, nodes pubescent, rooting at the lower nodes. Leaves basal and cauline; sheaths conspicuously retrorse-scabrous; ligules 0.5–1 mm long, eciliate membranes, apex truncate; blades 7–30 cm long, 5–15 mm wide, linear, flat, ascending, surfaces scaberulous, margins spinulose, apex acute. Panicles 10–30 cm long, 5–14 cm wide, open, elliptic or oblong, exserted or embraced at base by subtending leaf or enclosed, usually with 2 or more branches at the lowest node. Spikelets (4–)4.2–6.5 mm long, solitary, elliptic, strongly laterally compressed; lemmas awnless; anthers 3.

115. *Leersia virginica* Willd.

FIGURE 123

Leersia virginica Willd., Sp. Pl. 1(1): 325. 1797.
Common name: white grass.

Caespitose perennials; rhizomes short, scaly giving rhizome "braided" appearance. Culms 30–140 cm long, decumbent, sometimes rooting from lower nodes, nodes pubescent. Leaves basal and cauline; sheaths smooth or scaberulous; ligules 1–3 mm long, eciliate membranes, apex truncate; blades 4–20 cm long, (1–)6–15 mm wide, flaccid, linear, flat, surfaces glabrous or scaberulous or the abaxial surfaces sometimes densely pilose, margins hispid, apex acute. Panicles 10–25 cm long, open, exserted or embraced at base by subtending leaf, ovate, contracted

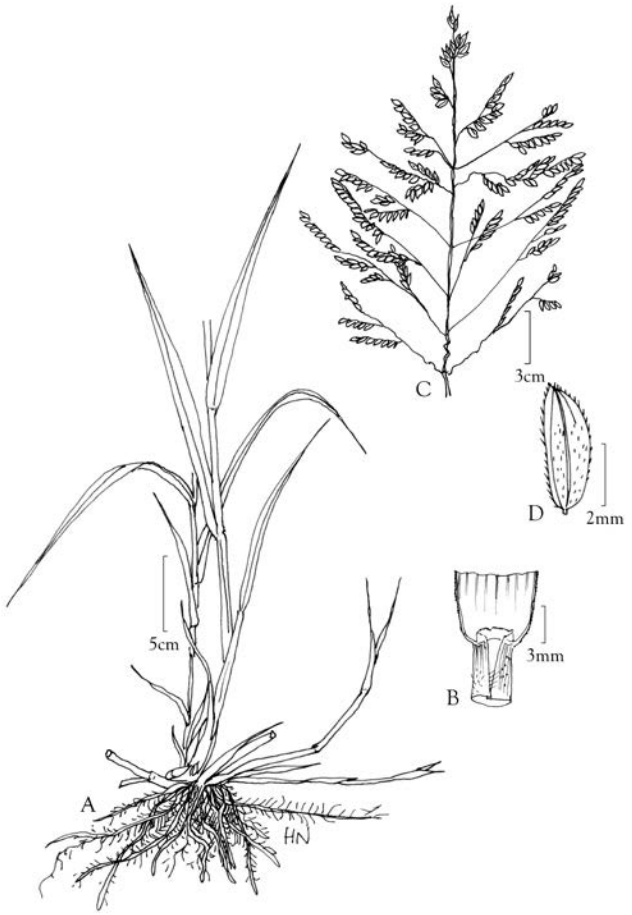

FIGURE 122. *Leersia oryzoides*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Leonard 1941* (US-1873998); D modified from Hitchcock (1951).

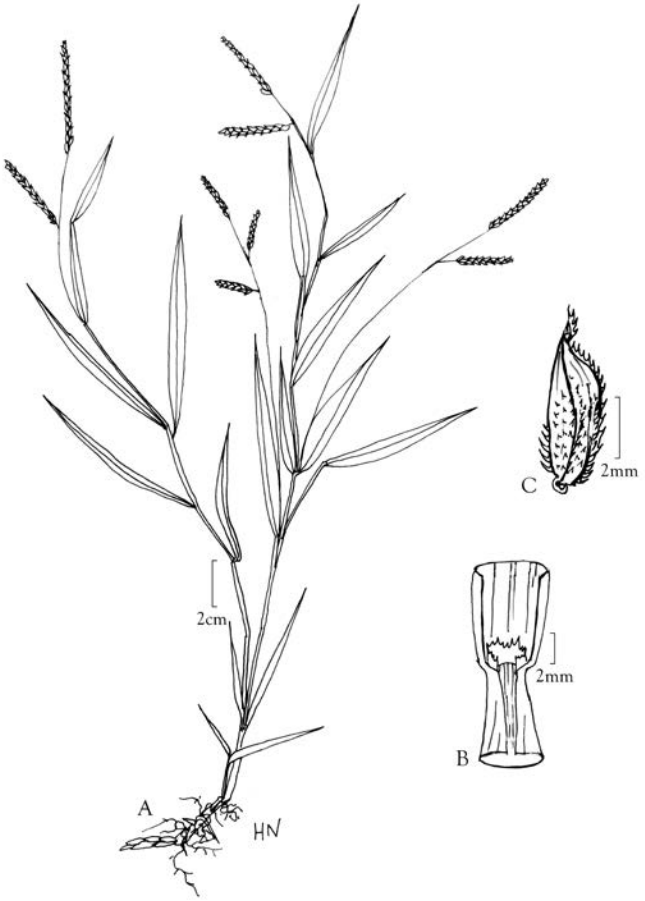

FIGURE 123. *Leersia virginica*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. Drawn from *Kanal 695* (US-3268388).

about secondary branches, bearing congested spikelets, 1 branch per node. Spikelets 2.5–3.6 mm long, ovate, strongly laterally compressed; lemmas awnless; anthers 2.

116. *Lolium arundinaceum** (Schreb.) Darbysh.

FIGURE 124

Lolium arundinaceum* (Schreb.) Darbysh., Novon 3(3): 241. 1993. [*Festuca arundinacea* Schreb.; *Schedonorus arundinaceus* (Schreb.) Dumort.]
Common names: alta fescue, tall fescue.

Caespitose perennials, sometimes rhizomatous. Culms to 2 m tall. Leaves basal and cauline; sheaths glabrous on surface, oral hairs ciliate, auricles falcate, ciliate; ligules 1–2 mm long, eciliate membranes, apex lacerate; blades 10–60 cm long, 4–12 mm wide, linear, flat, convolute in young shoots, surfaces smooth, margins scabrous, apex attenuate. Panicles 10–35 cm long, open, lanceolate or ovate, dense or loose. Spikelets 8–15.5 mm long, elliptic or oblong, laterally compressed; lemmas 5–9 mm long, awns 0–4 mm long.

117. *Lolium multiflorum** Lam.

FIGURE 125

Lolium multiflorum* Lam., Fl. Franç. 3: 621. 1778.
Common names: annual rye grass, Italian rye grass.

Caespitose annual or short-lived perennials. Culms 30–150 cm tall, erect or decumbent. Leaves basal and cauline; sheath surface glabrous, auricles falcate; ligules 1–2 mm long, eciliate membranes, apex truncate, entire; blades 10–30 cm long, (2–) 3–8(–13) mm wide, linear, flat, surfaces and margins scabrous, apex acute. Spikes 15–45 cm long, bilateral. Spikelets 8–31 mm long, packed edgewise (adaxially) to rachis, oblong, laterally compressed; principal lemma awns to 15 mm long.

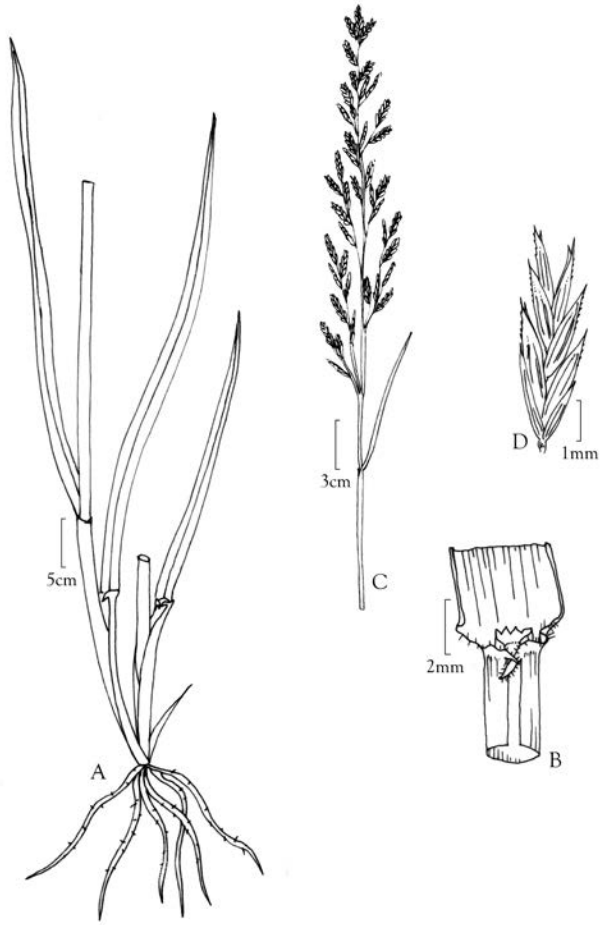

FIGURE 124. *Lolium arundinaceum*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 129* (US-3117694); D modified from Barkworth et al. (2007).

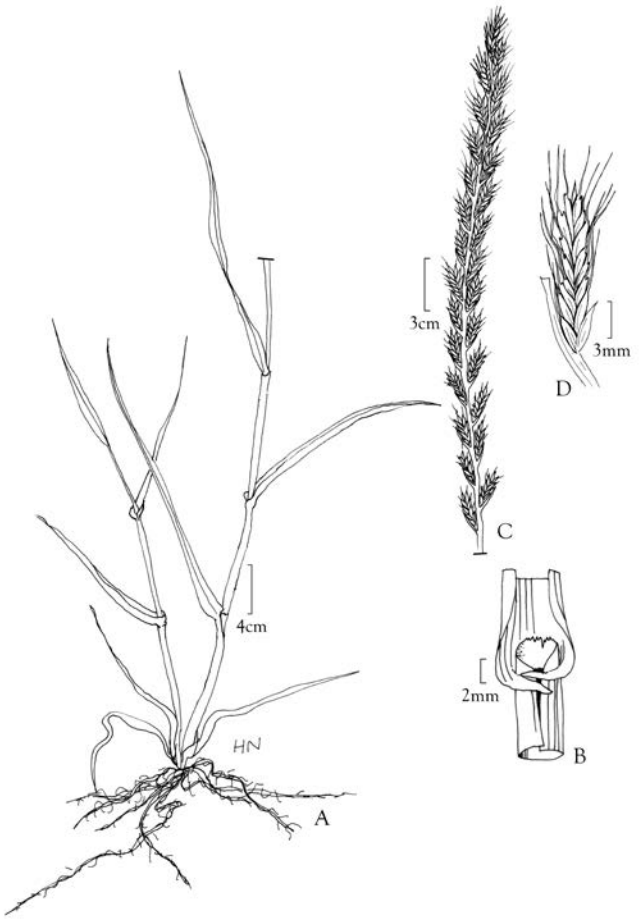

FIGURE 125. *Lolium multiflorum*. Base of culm. B. Sheath, ligule, and blade. C. Spike. D. Spikelet. A–C drawn from *Kanal 260* (US-3214594); D modified from Hitchcock (1951).

118. *Lolium perenne** L.

FIGURE 126

Lolium perenne* L., Sp. Pl. 1: 83. 1753.
Common name: perennial rye grass.

Caespitose perennials. Culms to 100 cm tall, erect or decumbent, glabrous. Leaves basal and cauline; sheath surface glabrous, oral hairs lacking, auricles falcate; ligules eciliate membranes, apex entire; blades 10–30 cm long, (1–)2–4(–6) mm wide, linear, flat, surfaces and margins glabrous, apex acute. Spikes 4–30 cm long, bilateral; spikelets 5–22 mm long, packed edgewise (adaxially) to rachis, oblong, laterally compressed; lemmas awnless or with awns to about 8 mm long.

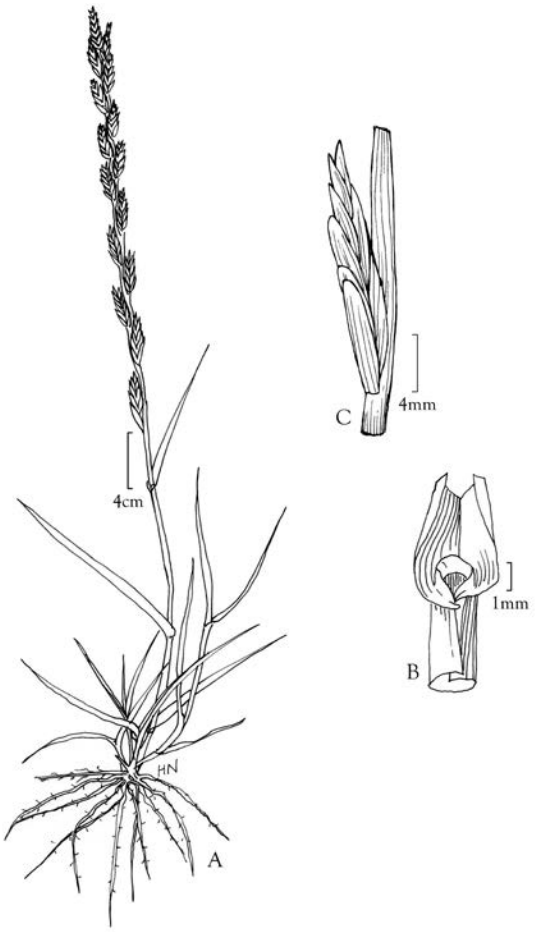

FIGURE 126. *Lolium perenne*. A. Habit. B. Sheath, ligule, and blade. C. Spike and rachis. A, B drawn from *Smith 5091* (US-2151147); C modified from Barkworth et al. (2007).

119. *Lolium pratense** (Huds.) Darbysh.

FIGURE 127

Lolium pratense* (Huds.) Darbysh., Novon 3(3): 242. 1993. [*Festuca pratensis* Huds.; *Schedonorus pratensis* (Huds.) P. Beauv.]
Common name: meadow fescue.

Caespitose perennials. Culms to 1.3 m tall, erect or geniculately ascending. Leaves mostly basal; sheaths smooth, glabrous on surface, auricles falcate, glabrous; ligules to 0.5 mm long, eciliate membranes, apex entire, truncate; blades 10–25 cm long, 2–7 mm wide, linear, folded or convolute, surfaces smooth, margins scaberulous, apex attenuate. Panicles (6–)10–25 cm long, open, lanceolate or ovate, diffuse, nodding. Spikelets (8.5–)12–15.5(–17) mm long, lanceolate or oblong, laterally compressed; lemmas 5–8 mm long, awnless.

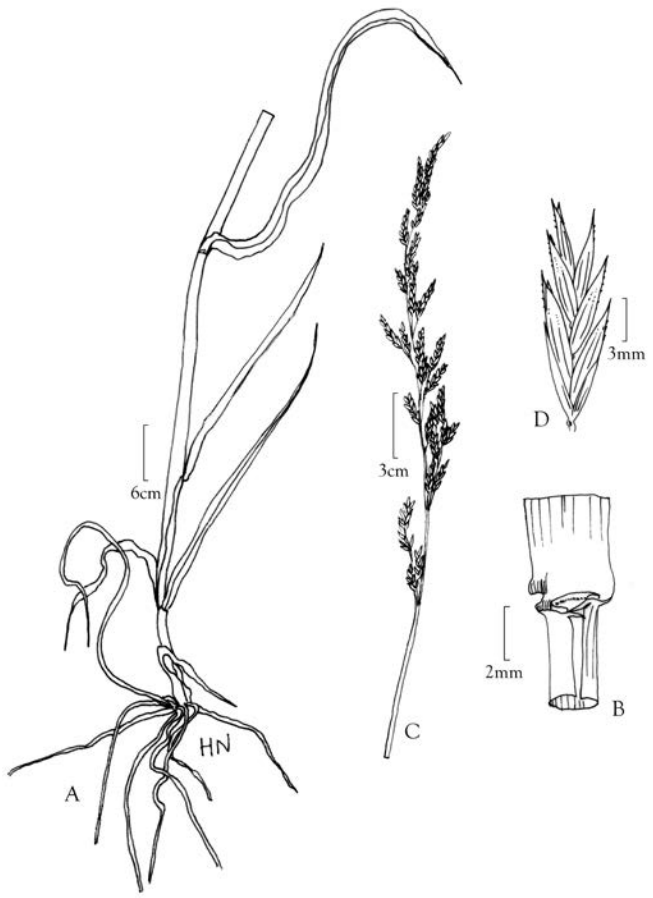

FIGURE 127. *Lolium pratense*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Allard 11321* (US-1898154).

120. *Melica mutica* Walter

FIGURE 128

Melica mutica Walter, Fl. Carol. 78. 1788.
Common names: melic, two-flowered melic.

Caespitose perennials; rhizomes elongated, short. Culms 45–100 cm tall, wiry; internodes sometimes scaberulous above the nodes. Leaves basal and cauline; sheaths tubular much of their length, glabrous or pilose; ligules 0.5–1 mm long, eciliate membranes, apex erose; blades 1.8–6 mm wide, linear, flat or conduplicate, abaxial surfaces glabrous scaberulous, adaxial surfaces puberulous, margins scabrous, apex acute. Panicles 4–25 cm long, open, lanceolate. Spikelets 7–11 mm long, pendulous, cuneate, laterally compressed; lower glumes 6.5–10 mm long, oblong; lemmas awnless.

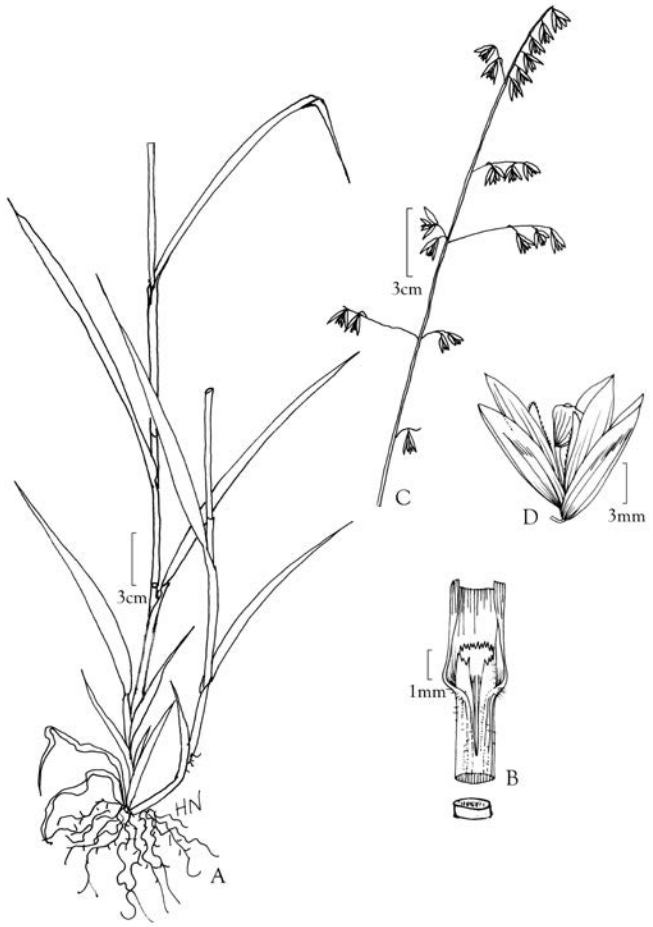

FIGURE 128. *Melica mutica*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Terrell 3979* (US-2618923); D modified from Hitchcock (1951).

121. *Microstegium vimineum** (Trin.) A. Camus

FIGURE 129

*Microstegium vimineum** (Trin.) A. Camus, Ann. Soc. Linn. Lyon, sér. 2, 68: 201. 1922.
Common names: coverall grass, Japanese stilt grass, Nepalese browntop.

Mat-forming annuals. Culms 40–100 cm long, decumbent, branched; rooting from lower nodes; nodes glabrous or pubescent. Leaves basal and cauline; sheaths shorter than internodes, surfaces mostly or sparsely pubescent above, margins ciliate, becoming pilose at the throat; ligules 0.5–0.8 mm long, eciliate membranes, apex truncate; blades 3–10 cm long, 8–15 mm wide, elliptic or oblong, flat, surfaces glabrous or sparsely pubescent, margins scabrous or sparsely hairy, apex acute or acuminate. Rames (primary

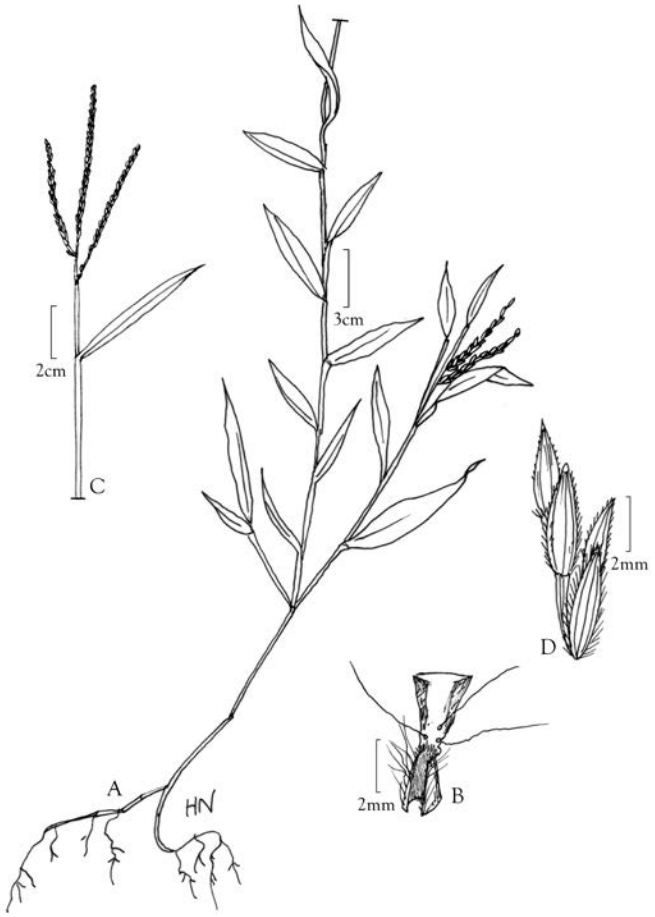

FIGURE 129. *Microstegium vimineum*. A. Habit. B. Sheath, ligule, and blade. C. Inflorescence with three rames. D. Spikelets. A–C drawn from *Kanal 437* (US-32779028); D modified from Barkworth et al. (2003).

inflorescence branches) 3–7 cm long, 1–5 per culm, paired or digitately to subdigitately arranged on the rachis, spreading or erect. Spikelets 3.7–6.5 mm long, in pairs, dorsally compressed; lower florets absent or reduced and sterile; upper lemmas usually awned, awns 2–15 mm long, often concealed by the glumes.

122. *Miscanthus sinensis** Andersson

FIGURE 130

*Miscanthus sinensis** Andersson, Öfvers. Förh. Kongl. Svenska Vetensk.-Akad. 12: 166. 1855.
Common names: eulalia, Chinese silver grass.

Robust caespitose perennials; rhizomes short; butt sheaths with white hairs. Culms 60–200 cm tall, 3–7 mm thick below, erect. Leaves predominantly basal; sheaths glabrous, with oral hairs bearded near summit; ligules 1–2 mm long, ciliolate membranes; blades 20–70 cm long, 6–20 mm wide, linear, flat, midveins conspicuous abaxially, surfaces glabrous, margins sharply serrate, apex acute. Panicles 15–25 cm long, 8–28 cm wide; primary branches usually 8–15 cm long, 4–40 per culm, corymbosely arranged on the rachis, drooping or ascending. Spikelets 3.5–7 mm long, in pairs, dorsally compressed, falling entire; callus hairs 6–12 mm long; upper lemma awns 6–12 mm long, from a sinus, geniculate, with twisted column.

123. *Muhlenbergia capillaris* (Lam.) Trin.

FIGURE 131

Muhlenbergia capillaris (Lam.) Trin., Gram. Unifl. Sesquifl. 191–192, 296, t. 5, f. 15. 1824.
Common name: hairy-awn muhly.

Caespitose perennials; butt sheaths glabrous. Culms 60–100(–150) cm tall, erect; internodes mostly glabrous, sometimes puberulent. Leaves primarily basal; sheaths rounded below,

FIGURE 130. *Miscanthus sinensis*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 093* (US-3075146); C modified from Hitchcock (1951).

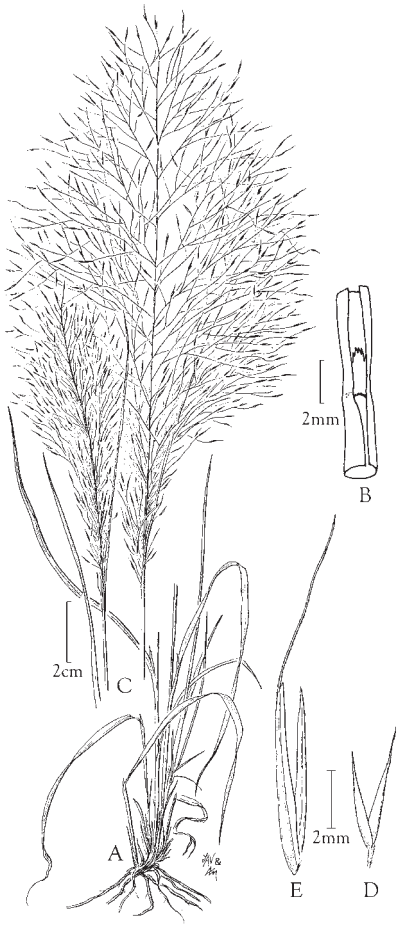

FIGURE 131. *Muhlenbergia capillaris*. A. Habit. B. Sheath, ligule, and blade. C. Upper culm and panicle. D. Glumes. E. Floret. Modified from Barkworth et al. (2003).

mostly glabrous, scaberulous below; ligules 1.8–5(–10) mm long, eciliate membranes, firm below, strongly decurrent, apex obtuse; blades 10–35(–50) cm long, 2–4 mm wide, flat or involute, glabrous, scabrous adaxially, apex acuminate. Panicles 15–50 cm long, 5–30 cm wide, open, diffuse, terminal. Spikelets 3–5 mm long, lanceolate, laterally compressed; glumes (0.3–)1–1.5(–2) mm long, usually less than 1/2 as long as lemma; principal lemma awns 2–18 mm long, straight.

124. *Muhlenbergia frondosa* (Poir.) Fernald

FIGURE 132

Muhlenbergia frondosa (Poir.) Fernald, Rhodora 45(534): 235. 1943.
Common name: wire-stem muhly.

Perennials not caespitose; rhizomes elongated, scaly. Culms 40–100 cm long, 0.7–1.8 mm thick, decumbent or bushy, slender; internodes glabrous; lateral branches ample, arising from upper culm. Leaves basal and cauline; sheaths glabrous on surface, margins hyaline; ligules 0.7–1.7 mm long, eciliate membranes erose to lacerate-ciliolate, apex truncate; blades 4–18 cm long, 2–7 mm wide, linear, flat, surfaces glabrous, margins scabrous, apex acute. Panicles 2–15 cm long, 0.3–2 cm wide, terminal and axillary, contracted, sometimes dense, linear or lanceolate, sometimes interrupted below. Spikelets 2.2–4 mm long, lanceolate, laterally compressed; glumes 2–4 mm long, 3/4 as long as to longer than the lemmas; principal lemma awns 0.1–13 mm long or unawned.

125. *Muhlenbergia glomerata* (Willd.) Trin.

FIGURE 133

Muhlenbergia glomerata (Willd.) Trin., Gram. Unifl. Sesquifl. 191, 297, t. 5, f. 10. 1824.
Common names: marsh muhly, spiked muhly.

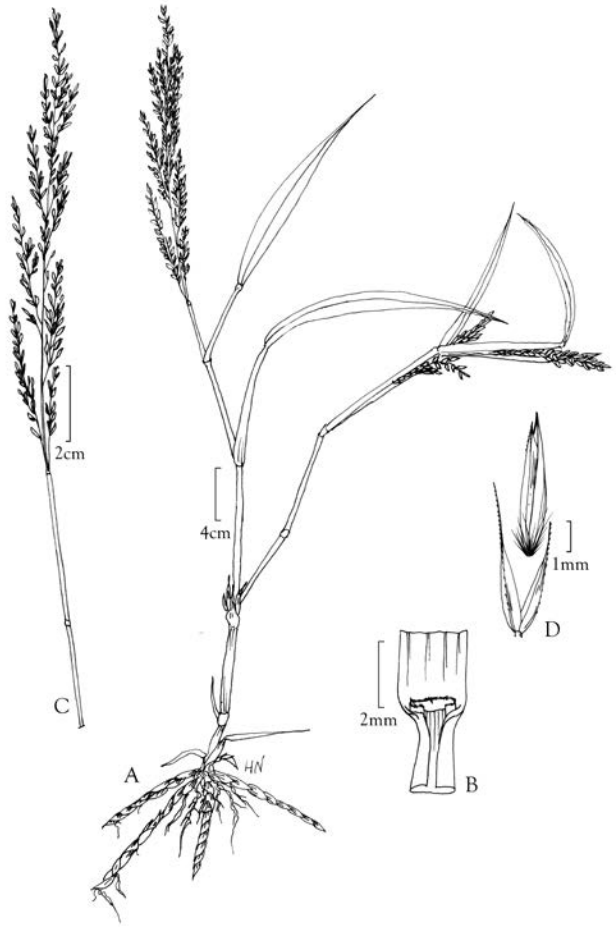

FIGURE 132. *Muhlenbergia frondosa*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Leonard 20980* (US-2614489); D modified from Hitchcock (1951).

FIGURE 133. *Muhlenbergia glomerata*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Chickering s.n.* (US-822958); D modified from Hitchcock (1951).

Perennials not caespitose; rhizomes elongated, scaly. Culms 30–120 cm tall, erect; internodes distally pubescent. Leaves basal and cauline; sheaths keeled, scaberulous; ligules 0.2–0.6 mm long, eciliate membranes, erose, apex truncate; blades 2–15 cm long, 2–6 mm wide, flat, linear, surfaces smooth or scaberulous, margins scabrous, apex acute. Panicles 1.5–12 cm long, 0.3–1.8 cm wide, spiciform, linear or lanceolate, continuous or interrupted below. Spikelets 3–8 mm long, lanceolate, laterally compressed; glumes 3–8 mm long (including the awn), about 1.3–2 times longer than the lemmas; lemmas unawned or mucronate (mucro less than 1 mm long).

126. *Muhlenbergia schreberi* J. F. Gmel.

FIGURE 134

Muhlenbergia schreberi J. F. Gmel., Syst. Nat. 2: 171. 1791.
Common name: nimblewill.

Caespitose perennials. Culms 10–45(–70) cm long, decumbent; internodes glabrous, often rooting from lower nodes. Leaves basal and cauline; sheath surfaces glabrous, margin pubescent; ligules 0.2–1 mm long, ciliolate membranes; blades 3–10 cm long, 2–4.5 mm wide, linear, flat, surfaces smooth or scaberulous, margins glabrous or sparsely hairy, apex acute. Panicles 3–15 cm long, open, linear. Spikelets 1.8–2.8 mm long, lanceolate, slightly laterally compressed; glumes 0.1–0.4 mm long, upper glumes lacking or rudimentary; principal lemma awns 1.5–5 mm long, straight or flexuous.

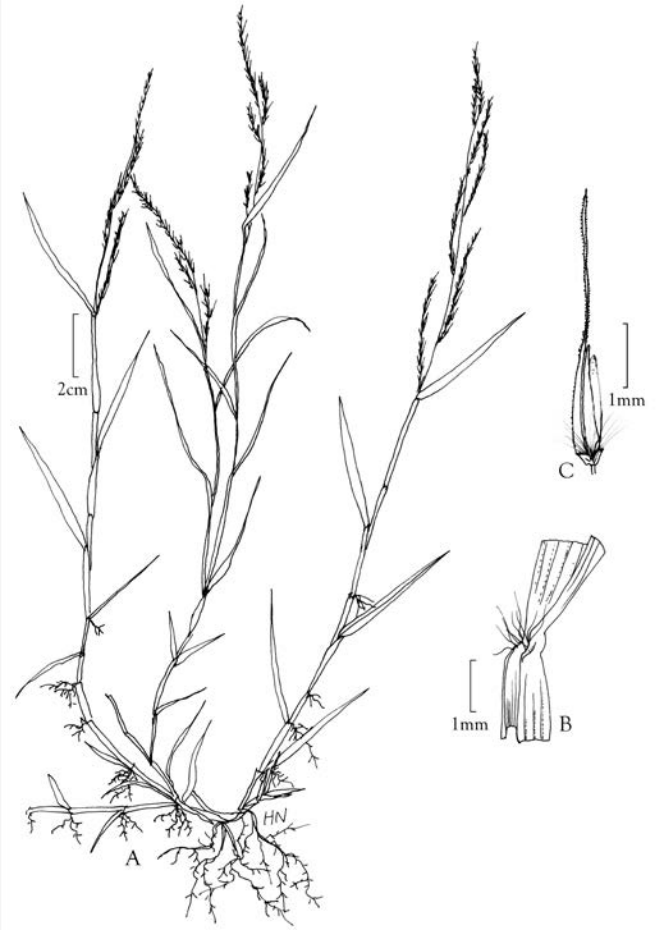

FIGURE 134. *Muhlenbergia schreberi*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 466* (US-3278992); C modified from Barkworth et al. (2003).

127. *Muhlenbergia sobolifera* (Muhl. ex Willd.) Trin.

FIGURE 135

Muhlenbergia sobolifera (Muhl. ex Willd.) Trin., Gram. Unifl. Sesquifl. 189, 297, t. 5, f. 4. 1824.
Common names: branched muhly, rock muhly.

Caespitose perennials or culms solitary; rhizomes elongated, scaly; butt sheaths papery. Culms 60–100 cm tall, erect or geniculately ascending; internodes distally pubescent; nodes glabrous;

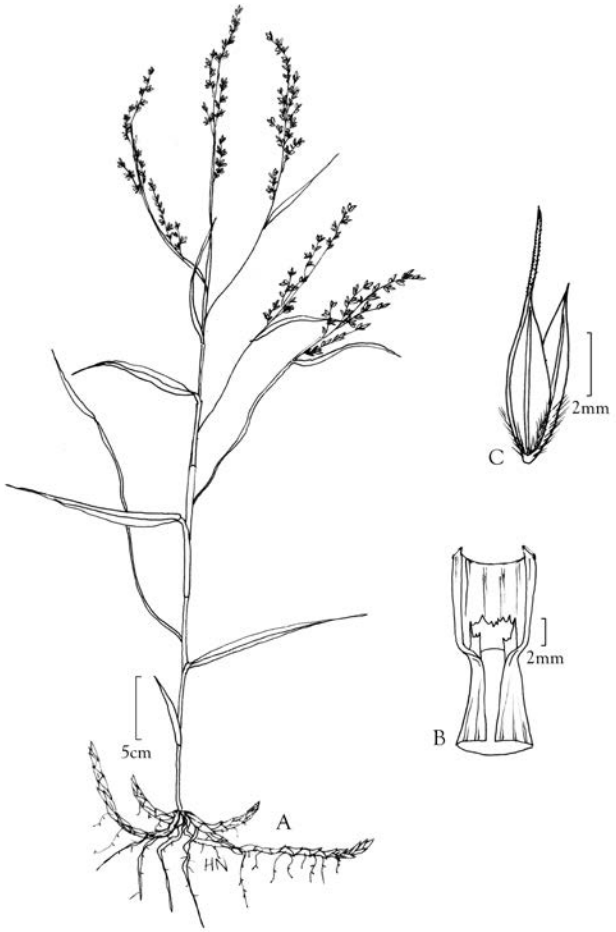

FIGURE 135. *Muhlenbergia sobolifera*. A. Habit. B. Sheath, ligule, and blade. C. Floret. A, B drawn from *Steele s.n.* (US-363891); C modified from Hitchcock (1951).

lateral branches sparse. Leaves basal and cauline; sheaths glabrous, outer margins glabrous or hairy; ligules 0.5–1 mm long, eciliate membranes, apex truncate, erose; blades 4–18 cm long, 0.2–0.8 mm wide, spreading, linear, flat, surfaces scabrous, rough on both sides, margins scabrous, apex attenuate. Panicles 4–18 cm long, 2–7 cm wide, contracted, linear, equilateral or nodding. Spikelets 1.6–3 mm long, lanceolate, laterally compressed; glumes 1–2.5 mm long, much shorter than the lemmas; lemmas awnless or mucronate.

128. *Muhlenbergia sylvatica* (Torr.) Torr. ex A. Gray

FIGURE 136

Muhlenbergia sylvatica (Torr.) Torr. ex A. Gray, N. Amer. Gram. 1: 13. 1834.

Common names: forest muhly, woodland muhly.

Perennials; rhizomes elongated, scaly. Culms 40–110 cm tall, erect, slender, wiry; internodes retrorsely scabrous, distally pubescent; lateral branches ample, arising from mid-culm. Leaves basal and cauline; sheaths glabrous, scaberulous distally, margins hyaline; ligules 0.4–1.2 mm long, eciliate membranes, apex erose, truncate, lacerate-ciliolate; blades 6–20 cm long, 4–10(–15) mm wide, linear, flat, surfaces scabrous to scaberulous, occasionally smooth, margins scabrous, apex acute. Panicles 10–33 cm long, 0.2–0.8 cm wide, contracted, linear, interrupted, loose. Spikelets 2.6–4.5 mm long, lanceolate, laterally compressed; glumes 1.8–3 mm long, nearly as long as lemmas; principal lemma awns 5–18 mm long.

129. *Muhlenbergia tenuiflora* (Willd.) Britton, Sterns & Poggenb.

FIGURE 137

Muhlenbergia tenuiflora (Willd.) Britton, Sterns & Poggenb., Prelim. Cat. 67. 1888.

Common names: slender-flowered muhly, slender muhly.

Annuals or short-lived perennials; rhizomes elongated, scaly. Culms 40–120 cm tall, erect or geniculately ascending;

FIGURE 136. *Muhlenbergia sylvatica*. A. Habit. B. Sheath, ligule, and blade. C. Glumes. D. Floret. A, B drawn from *Lamson-Scribner 809* (US-207926); D modified from Hitchcock (1951).

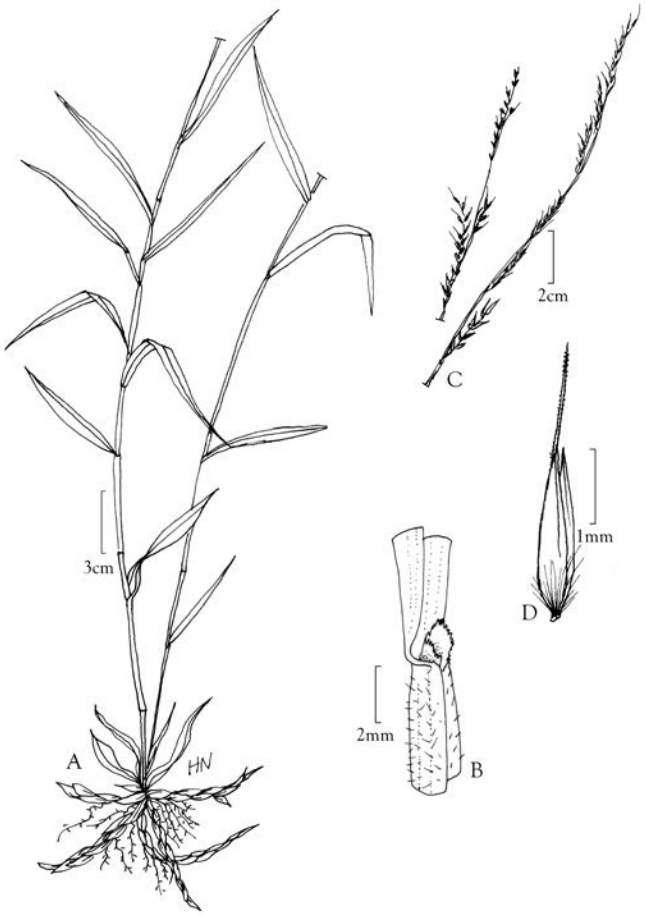

FIGURE 137. *Muhlenbergia tenuiflora*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Floret. A–C drawn from *Steele s.n.* (US-363892); D modified from Hitchcock (1951).

internodes distally pubescent; nodes retrorsely pubescent; lateral branches lacking or sparse. Leaves cauline; sheaths loose, pubescent; ligules 0.4–1.2 mm long, eciliate membranes, apex truncate; blades 6–20 cm long, 4–10(–15) mm wide, spreading, linear, flat, surfaces glabrous abaxially scaberulous adaxially, margins scaberulous, apex acute. Panicles 10–33 cm long, 0.2–0.8 cm wide, contracted, linear, nodding. Spikelets 2.6–4.5 mm long, lanceolate, laterally compressed; glumes 1.3–3 mm long, shorter than lemmas; principal lemma awns 2–11 mm long.

130. *Panicum capillare* L.

FIGURE 138

Panicum capillare L., Sp. Pl. 1: 58. 1753.
Common names: common panic grass, old-witch grass, witch grass.

Caespitose annuals, often bluish or purplish. Culms 15–130 cm tall, erect or geniculately ascending, slender to stout, straight to sinuous, sparsely or freely branched; nodes densely bearded. Leaves basal and cauline; sheaths rounded, hispid, with tubercle-based hairs; ligules 0.5–1.5 mm, ciliate membrane; blades 5–40 cm long, 3–18 mm wide, linear or lanceolate, flat, spreading, hispid both sides, apex attenuate. Panicles 13–50 cm long, 7–24 cm wide, open, oblong or ovate, diffuse. Spikelets 1.9–4 mm long, elliptic or oblong, often reddish purple, dorsally compressed, acute or acuminate; lower lemmas 1.9–3 mm long, awnless.

131. *Panicum dichotomiflorum* Michx.

FIGURE 139

Panicum dichotomiflorum Michx., Fl. Bor.-Amer. 1: 48. 1803.
Common names: fall panic grass, spreading witch grass.

Caespitose annuals or short-lived perennials. Culms 50–200 cm tall, geniculately ascending or decumbent; rooting at the lower nodes; freely branching from lower to middle nodes; nodes glabrous, usually swollen. Leaves cauline; sheaths sparsely pubescent near the base, elsewhere glabrous, compressed; ligule 0.5–2

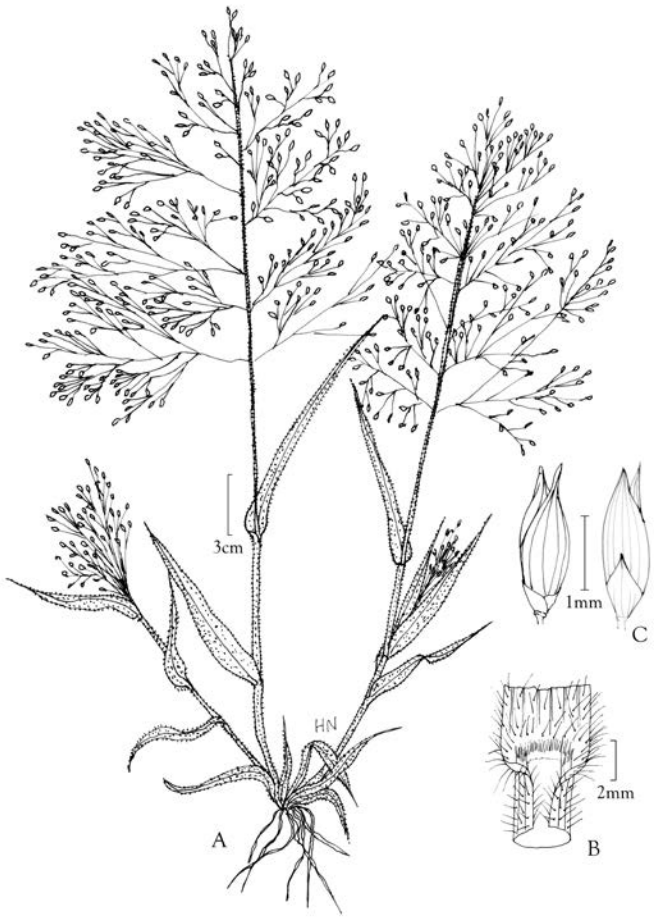

FIGURE 138. *Panicum capillare*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Beyersdorfer 358* (US-3047086); C modified from Hitchcock (1951).

FIGURE 139. *Panicum dichotomiflorum*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Ball 2989* (US-304327); D modified from Hitchcock (1951).

mm long, ciliate membranes; blades 10–65 cm long, 3–12(–25) mm wide, linear, flat, midrib conspicuous, surfaces glabrous or puberulous, hairy adaxially, margins scabrous, apex acute. Panicles 12–40 cm long, open, ovate, diffuse, terminal and axillary, embraced at base by subtending leaf. Spikelets 1.8–3.8 mm long, elliptic or oblong, dorsally compressed, acute or acuminate; lemmas 1.8–2.8 mm long, awnless.

132. *Panicum flexile* (Gatt.) Scribn.

FIGURE 140

Panicum flexile (Gatt.) Scribn., Bull. Torrey Bot. Club 20(12): 476. 1893.
Common name: wiry panic grass.

Caespitose annuals. Culms 10–75 cm tall, erect; much branched from the base; internodes solid, distally glabrous to hispid; nodes glabrous or pubescent or bearded. Leaves cauline; sheaths longer than the internodes, sometimes purplish, glabrous to sparsely hispid; ligules 0.5–1.5 mm long, fringe of hairs; blades 3–23 cm long, 1–7 mm wide, linear, flat, surfaces hispid, sparsely hirsute or pilose (rarely glabrous), margins involute, scabrid, apex acute. Panicles 5–45 cm long, 1–6 cm wide, 3 times longer than wide, open, ovate, terminal and axillary. Spikelets 2.5–3.7 mm long, elliptic or oblong, dorsally compressed, acute or acuminate; lower lemmas 2.2–2.7 mm long, awnless.

133. *Panicum gattingeri* Nash

FIGURE 141

Panicum gattingeri Nash, Fl. S.E. U.S. 92, 1327. 1903.
Common name: Gattinger's panic grass.

Caespitose annuals. Culms 20–100 cm tall, slender to robust, erect or geniculately ascending; freely branching, rooting at the lower nodes; internodes pubescent, hirsute, tuberculate-based hairs; nodes pubescent bearded. Leaves cauline; sheaths hispid, with tubercle-based hairs; ligules 0.5–2 mm long, ciliate

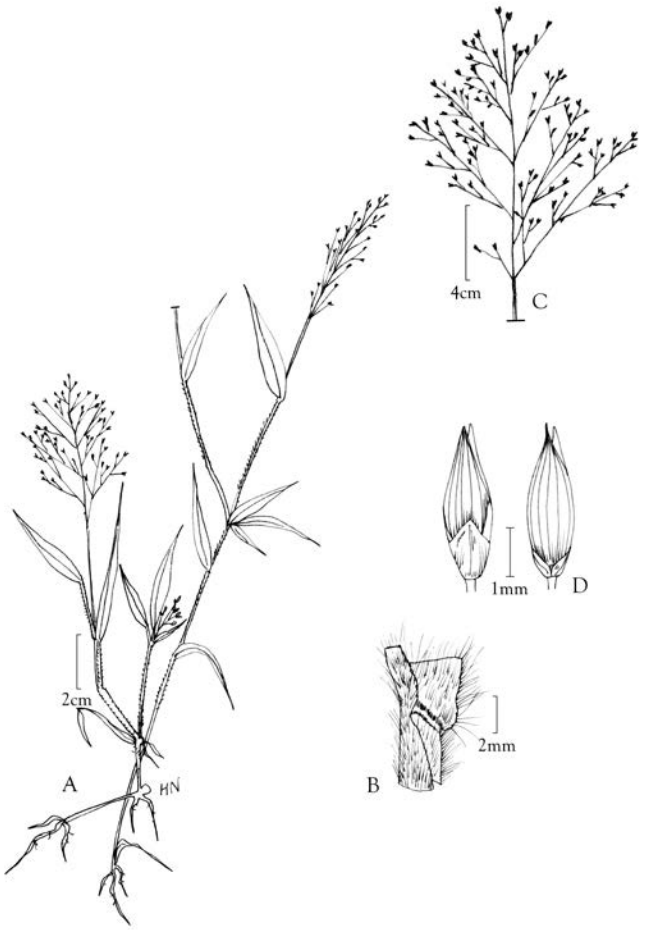

FIGURE 140. *Panicum flexile*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Allard 12175* (US-2564070A); D modified from Hitchcock (1951).

FIGURE 141. *Panicum gattingeri*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Hitchcock 167* (US-3048449); D modified from Hitchcock (1951).

membranes; blades 7–30(–100) cm long, 6–10 mm wide, linear or lanceolate, flat, surfaces glabrous, margins tuberculate, apex attenuate. Panicles 7–27 cm long, 4–24 cm wide, 1/3 as long as the plant, open, oblong or ovate, diffuse. Spikelets 1.9–2.4 mm long, elliptic or oblong, dorsally compressed, acute or acuminate; lower lemmas 1.6–2 mm long, awnless.

134. *Panicum miliaceum** L.

FIGURE 142

Panicum miliaceum* L., Sp. Pl. 1: 58. 1753.
Common names: broom-corn millet, proso, hog millet.

Caespitose annuals. Culms 20–210 cm tall, stout, not woody, erect or geniculately ascending, sometimes branching from lower nodes; internodes distally glabrous or pubescent or hispid; nodes glabrous or pubescent or bearded. Leaves basal and cauline; sheaths hispid; ligules 1.5–3 mm long, ciliate membranes; blades 15–40 cm long, 7–25 mm wide, linear, flat, surfaces glabrous or pubescent or hispid, margins pubescent, apex acute. Panicles 6–20 cm long, 4–11 cm wide; dense, somewhat contracted, obovate, nodding. Spikelets 4–6 mm long, elliptic or ovate, slightly dorsally compressed; lower lemmas 4–4.8 mm long, awnless.

135. *Panicum philadelphicum* Bernh. ex Trin.

FIGURE 143

Panicum philadelphicum Bernh. ex Trin., Gram. Panic. 216. 1826.
Common names: Philadelphia witch grass, wood witch grass.

Caespitose annuals. Culms 8–100 cm tall, erect, often slender, branched; internodes distally hirsute or hispid; nodes bearded. Leaves cauline; sheaths usually longer than the internodes, hispid, with tubercle-based hairs; ligules 0.5–1.5 mm long, fringe of hairs; blades 3–30 cm long, 2–12 mm wide, light

FIGURE 142. *Panicum miliaceum*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Steele s.n.* (US-494805); D modified from Hitchcock (1951).

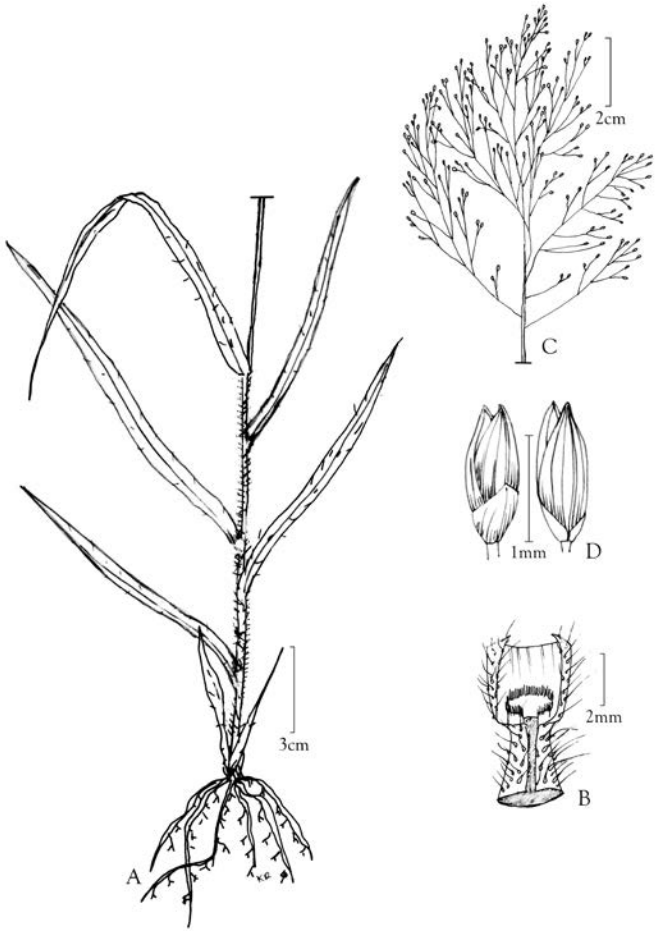

FIGURE 143. *Panicum philadelphicum*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Holm 105* (US-2380743); D modified from Barkworth et al. (2003).

green, linear, flat, hirsute to sparsely pilose on both sides, margins tuberculate-ciliate, apex acute. Panicles 7–27 cm long, 4–24 cm wide, 1/4–1/3 as long as the culm, open, ovate, diffuse. Spikelets 1.4–2.4 mm long, elliptic, dorsally compressed, clustered toward branch tips, acute; lower lemmas 1.6–1.9 mm long, awnless.

136. *Panicum verrucosum* Muhl.

FIGURE 144

Panicum verrucosum Muhl., Descr. Gram. 113. 1817.
Common name: warty panic grass.

Solitary annuals. Culms 10–150 cm tall, weak, erect or geniculately ascending or decumbent, glabrous; rooting at the lower nodes; lateral branches sparse or ample. Leaves cauline; sheaths glabrous, outer margin hairy; ligules 0.2–0.5 mm long, fringe of hairs; blades 5–20 cm long, 3–10 mm wide, flaccid, light green, linear, flat, surfaces thin, glabrous on both sides, margins scaberulous, apex long-acuminate. Panicles 5–30 cm long, nearly as wide as long, open, ovate, diffuse, bearing few spikelets. Spikelets 1.7–2.2 mm long, elliptic or obovate, dorsally compressed, clustered toward branch tips; upper glumes and lower lemmas distinctly verrucose; upper florets 1.6–2 mm long; lemmas awnless.

137. *Panicum virgatum* L.

FIGURE 145

Panicum virgatum L., Sp. Pl. 1: 59. 1753.
Common names: switch grass, wand panic grass.

Caespitose or solitary perennials; rhizomes elongated, scaly. Culms 40–300 cm tall, erect or decumbent; nodes glabrous or glaucous. Leaves basal and cauline; sheaths longer than the lower internodes, shorter than those above, glabrous or pilose; ligules 2–6 mm long, ciliolate membranes; blades 10–60 cm

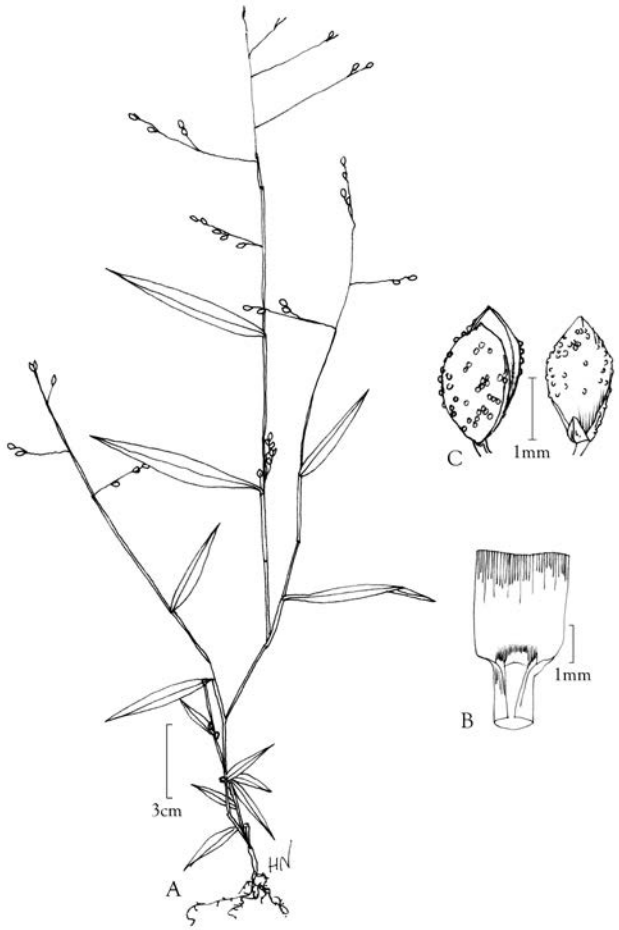

FIGURE 144. *Panicum verrucosum*. A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Chase–Amer. Gr. Nat. Herb. 67* (US-2488443); C modified from Barkworth et al. (2003).

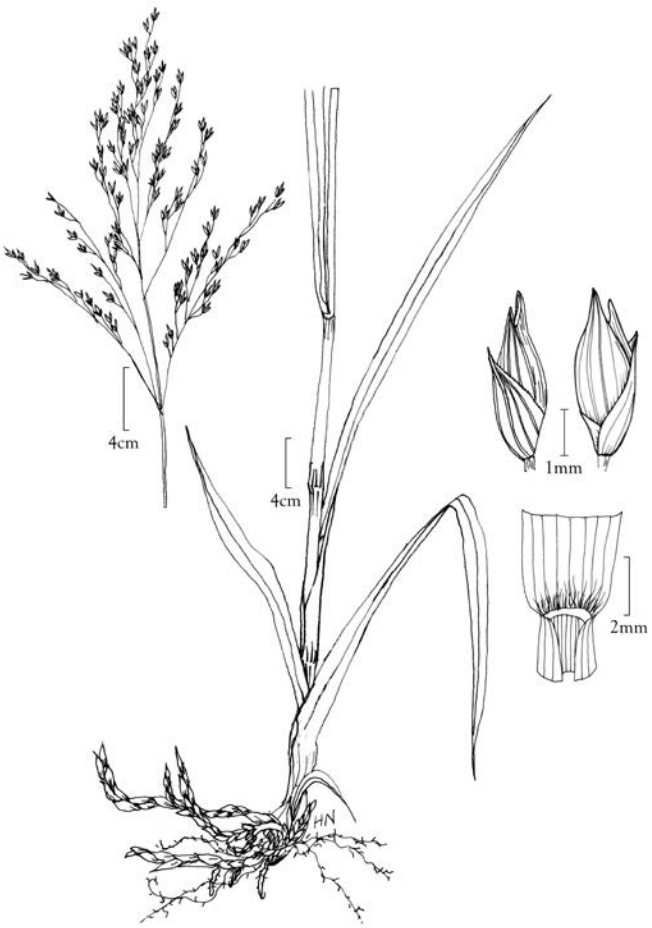

FIGURE 145. *Panicum virgatum*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Strong & Simmon 2766* (US-3434006); D modified from Hitchcock (1951).

long, 2–15 mm wide, ascending or spreading, linear, flat, surfaces glabrous or pilose, margins scabrous, apex acute. Panicles 10–55 cm long, 4–20 cm wide, open, ovate. Spikelets 2.5–8 mm long, ovate, dorsally compressed; upper florets 2.3–3 mm long; lemmas awnless.

138. *Paspalum dilatatum** Poir.

FIGURE 146

Paspalum dilatatum* Poir., Encycl. 5: 35. 1804.
Common names: Dallis grass, golden crown grass.

Caespitose perennials; basal innovations flabellate; rhizomes short, forming a knotty base. Culms 50–175 cm tall, erect, nodes glabrous. Leaves basal and cauline; sheaths glabrous or pubescent; ligules 1.5–3.8 mm long, eciliate membrane, apex lacerate; blades 6–35 cm long, 2–16 mm wide, linear, flat, glabrous with a few long hairs near the base, margins scabrous, apex acute. Panicles with (2–)3–7(–11) spikelike unilateral branches racemosely arranged on a central axis; branches 1.5–12 cm long. Spikelets 2.3–4 mm long, 1.7–2.5 mm wide, ovate, dorsally compressed, paired, appressed to the branch axis; lower lemmas 5–7-veined, awnless.

FIGURE 146. *Paspalum dilatatum.* A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Wells & Brown 4191* (US-3418174); C modified from Hitchcock (1951).

139. *Paspalum dissectum* (L.) L.

FIGURE 147

Paspalum dissectum **(L.) L., Sp. Pl. (ed.** 2) 1: 81. 1762.
Common names: mudbank crown grass, Walter's paspalum.

Mat-forming perennials; rhizomatous from a creeping base. Culms 10–50 cm tall, decumbent or prostrate, glabrous or pubescent; lateral branches ample. Leaves basal and cauline; sheaths glabrous; ligules 2–2.5 mm long, eciliate membranes, apex slightly erose; blades 3–12 cm long, 1.3–4.8 mm wide, linear, flat, glabrous or pubescent to sparsely hairy, margins scabrous,

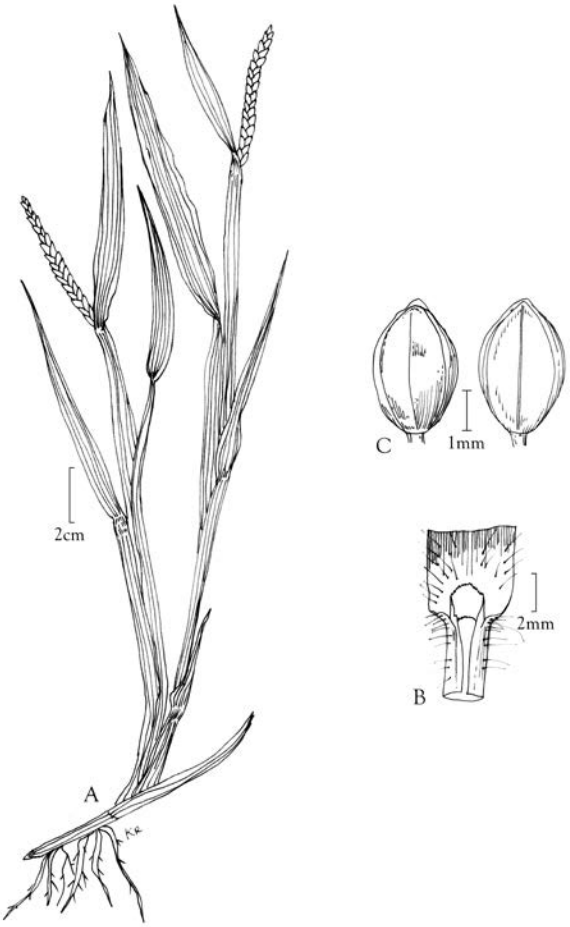

FIGURE 147. *Paspalum dissectum.* A. Habit. B. Sheath, ligule, and blade. C. Spikelets. A, B drawn from *Ball s.n.* (US-73585); C modified from Barkworth et al. (2003).

apex acute. Panicles with 2–4 spikelike unilateral branches racemosely arranged on a central axis; branches 1.4–7 cm long. Spikelets 1.7–2.1 mm long, 1–1.6 mm wide, oblong, dorsally compressed, usually paired, appressed to the branch axis, obtuse or subacute; lower lemmas 3-veined, awnless.

140. *Paspalum floridanum* Michx.

FIGURE 148

Paspalum floridanum Michx., Fl. Bor.-Amer. 1: 44. 1803.
Common names: Florida crown grass, Florida paspalum.

Stout caespitose perennials; rhizomes short. Culms 80–210 cm tall, erect, glabrous, solitary or few; nodes glabrous or pubescent. Leaves basal and cauline; sheaths glabrous or hirsute; ligules 1.2–2.3 mm long, eciliate membranes, apex erose, subentire; blades 15–52 cm long, 3–18 mm wide, linear, flat or conduplicate, glabrous or hirsute, margins pubescent, apex acute.

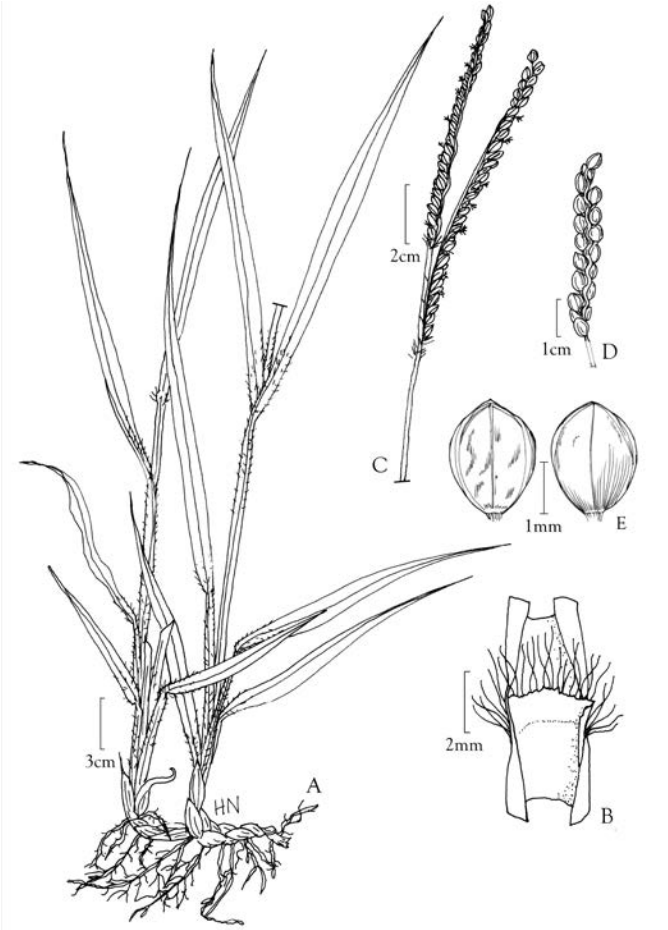

FIGURE 148. *Paspalum floridanum*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Panicle branch. E. Spikelets. A–D drawn from *Kanal 766* (US-3278959); E modified from Hitchcock (1951).

Panicles with 2–4 spikelike unilateral branches racemosely arranged on a central axis; branches 1–3 cm long. Spikelets 2.9–4.1 mm long, 1.9–3.1 mm wide, oblong, dorsally compressed, paired, appressed to the branch axis, obtuse or subacute; lower lemmas 3-veined, awnless.

141. *Paspalum laeve* Michx.

FIGURE 149

Paspalum laeve Michx., Fl. Bor.-Amer. 1: 44. 1803.
Common names: field crown grass, smooth paspalum.

Caespitose perennials; butt sheaths sparsely hairy. Culms 40–120 cm tall, erect or geniculately ascending; nodes glabrous or pubescent. Leaves basal and cauline; sheaths compressed, glabrous or pilose; ligules 1.5–3.8 mm long, eciliate membranes, apex entire to lacerate; blades 5–37 cm long, 2–9.3 mm wide, linear, conduplicate, glabrous or pilose, margins sparsely hairy,

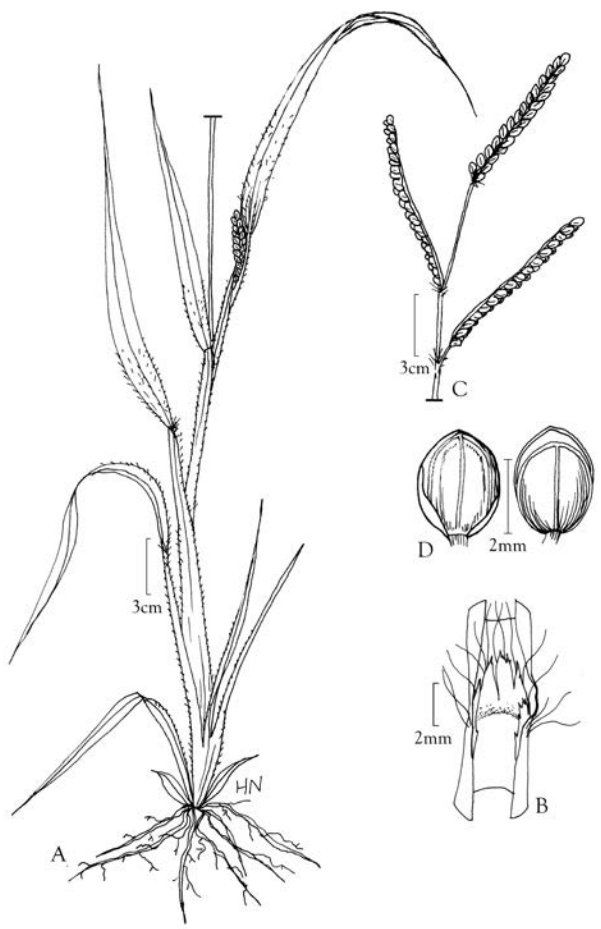

FIGURE 149. *Paspalum laeve*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Kanal 691* (US-3268311); D modified from Hitchcock (1951).

apex acute. Panicles with 1–6 spikelike unilateral branches racemosely arranged on a central axis; branches 4–10 cm long. Spikelets 2.3–3.3 mm long, ovate or orbicular, dorsally compressed, solitary; lower lemmas 5-veined, awnless.

142. *Paspalum pubiflorum* Rupr. ex E. Fourn.

FIGURE 150

Paspalum pubiflorum Rupr. ex E. Fourn., Mexic. Pl. 2: 11. 1886.
Common name: hairy-seed crown grass.

Perennials; butt sheaths fibrous. Culms 30–130 cm tall, geniculately ascending or decumbent; nodes rooting below, glabrous or pubescent. Leaves basal and cauline; sheaths glabrous or pubescent with tubercle-based hairs; ligules 1–3.2 mm long, eciliate membranes, apex erose; blades 10–31 cm long, 4–18 mm wide, lanceolate, flat, glabrous with a few hairs near base, margins scabrous, apex acute. Panicles with 2–5(–7) spikelike unilateral branches racemosely arranged on a central axis; branches 3–10 cm long. Spikelets 2.5–3.1 mm long, 1.5–2 mm wide, elliptic or obovate, dorsally compressed, in pairs and forming 4 rows; lower lemmas 3–7-veined, awnless.

143. *Paspalum setaceum* Michx.

FIGURE 151

Paspalum setaceum Michx., Fl. Bor.-Amer. 1: 43. 1803.
Common names: slender crown grass, slender paspalum.

Caespitose perennials; rhizomes short; butt sheaths pubescent. Culms 25–110 cm long, erect, spreading or prostrate; nodes glabrous or pubescent. Leaves mostly basal; sheaths glabrous or pubescent; ligules 0.2–0.5 mm long, eciliate membranes; blades 5–30 cm long, 2–20 mm wide, linear or lanceolate, bases broadly rounded or cordate, glabrous to hirsute, margins pubescent, apex acuminate. Panicles with 1–6 spikelike unilateral branches

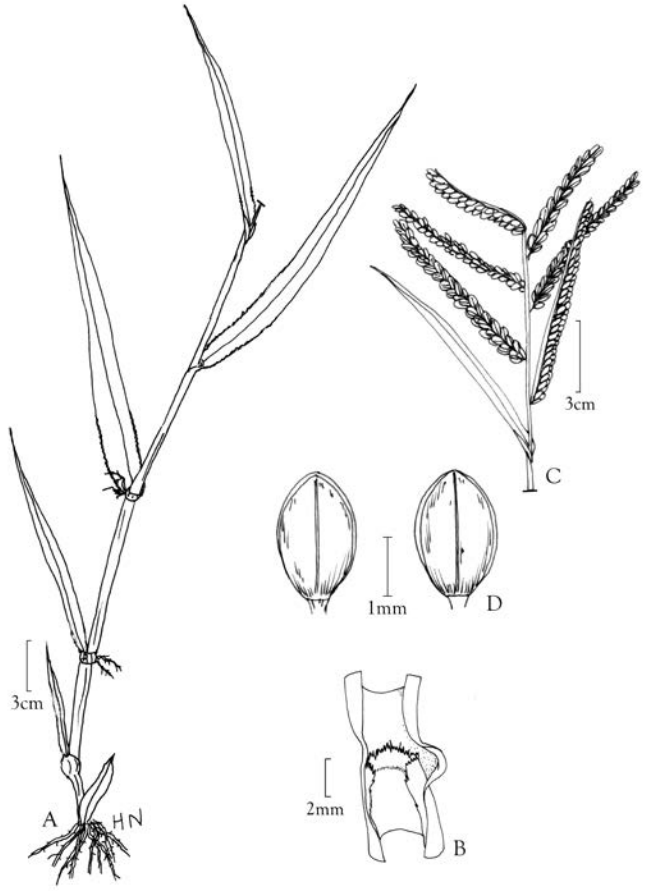

FIGURE 150. *Paspalum pubiflorum*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Kanal 232* (US-3230410); D modified from Barkworth et al. (2003).

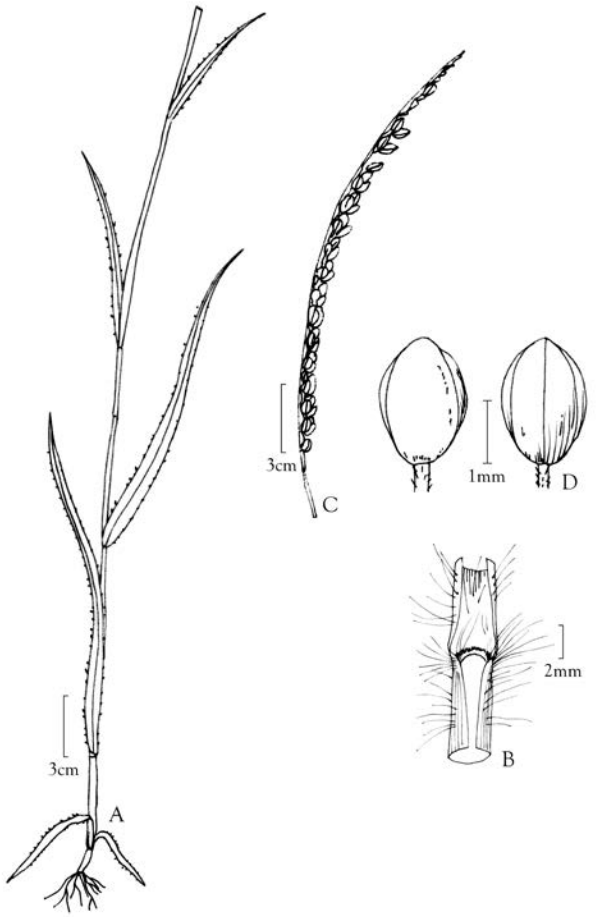

FIGURE 151. *Paspalum setaceum*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelets. A–C drawn from *Kanal 325* (US-3214585); D modified from Hitchcock (1951).

racemosely arranged on a central axis; branches 3–17 cm long, terminal and axillary. Spikelets 1.4–2.6 mm long, elliptic, orbicular or obovate, dorsally compressed, single or paired; lower lemmas 3-veined, awnless.

144. *Phalaris arundinacea* L.

FIGURE 152

Phalaris arundinacea L., Sp. Pl. 1: 55. 1753.
Common name: reed canary grass.

Perennial; not caespitose; rhizomes elongated, scaly; butt sheaths glabrous. Culms 40–230 cm tall, erect. Leaves cauline; ligules 4–10(–11) mm long, eciliate membranes, apex truncate, lacerate; blades 10–30 cm long, 5–20 mm wide, linear, flat, surfaces scabrous, margins serrate, apex acute. Panicles 5–40 cm long, 1–4 cm wide, contracted, linear, interrupted. Spikelets 3.5–7.5 mm long, ovate, strongly laterally compressed; lemmas awnless.

145. *Phalaris canariensis* L.

FIGURE 153

Phalaris canariensis L., Sp. Pl. 1: 54–55. 1753.
Common names: birdseed grass, canary grass.

Caespitose annuals. Culms 30–100 cm tall, erect or geniculately ascending. Leaves cauline; sheath surface glabrous; ligules 3–6 mm long, eciliate membrane, apex rounded to obtuse, lacerate; blades 5–25 cm long, 2–10 mm wide, linear, flat, surfaces glabrous, margins scabrous, apex acute. Panicles 1.5–5 cm long, 1.5–2 cm wide, spiciform or capitate, ovate. Spikelets 6–10 mm long, obovate, strongly laterally compressed; lemmas awnless.

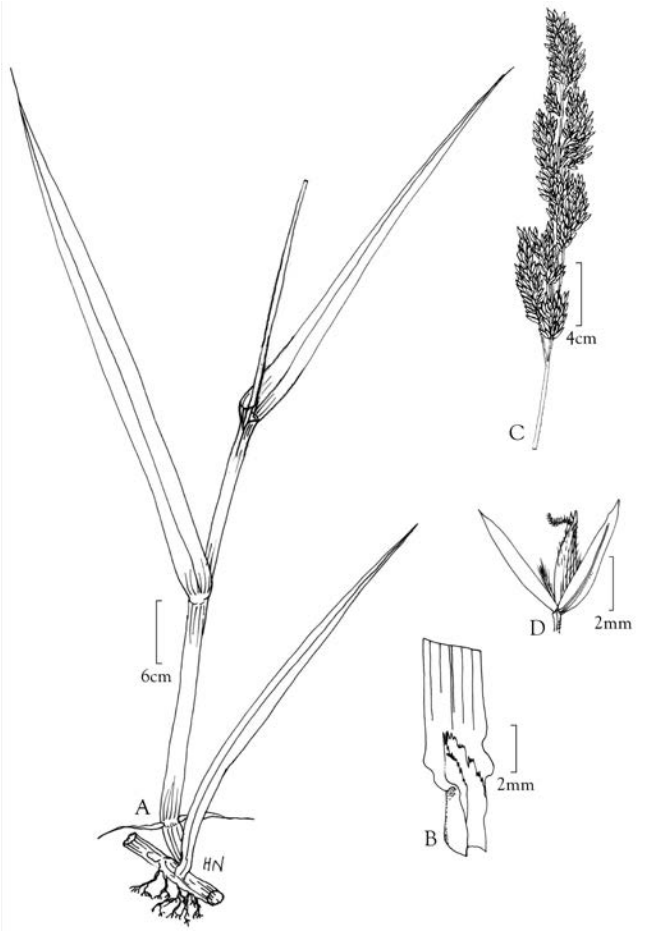

FIGURE 152. *Phalaris arundinacea*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 363* (US-3214567); D modified from Barkworth et al. (2007).

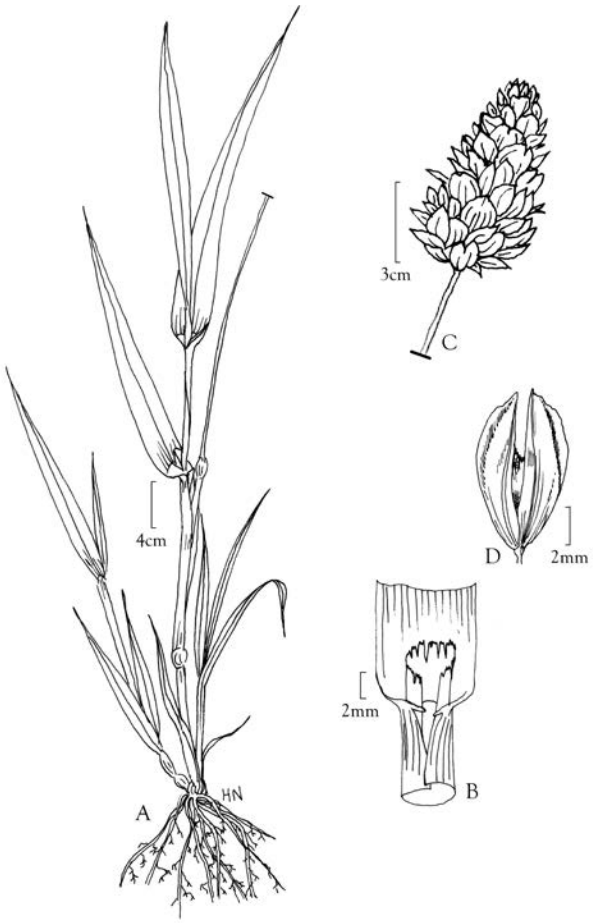

FIGURE 153. *Phalaris canariensis*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Vasey s.n.* (US-979920); D modified from Hitchcock (1951).

146. *Phleum pratense** L.

FIGURE 154

*Phleum pratense** L., Sp. Pl. 1: 59. 1753.
Common name: timothy.

Caespitose perennials; butt sheaths glabrous, dark brown. Culms (20–)50–150 cm tall, erect or geniculately ascending, glabrous except the scabrous apex; lower internodes frequently enlarged or bulbous. Leaves cauline; sheaths glabrous, sheaths of the flag leaves not inflated; auricles occasionally present, inconspicuous; ligules 1–6 mm long, eciliate membranes, apex obtuse to acute; blades 4–20 cm long, 4–8(–10) mm wide, linear, flat, surface glabrous, margins scaberulous, apex acute. Panicles (2–)6–15(–30) cm long, 0.6–2 cm wide, spiciform, linear. Spikelets 3–3.8 mm long, oblong, laterally compressed, truncate; lemmas awnless.

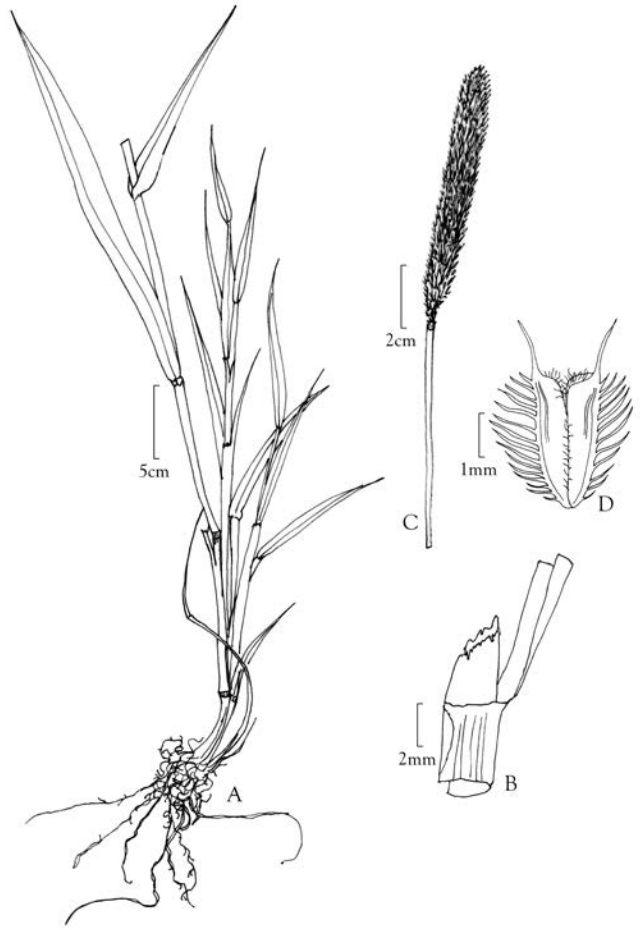

FIGURE 154. *Phleum pratense*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Allard 20474* (US-210140); D modified from Hitchcock (1951).

147. *Phragmites australis* (Cav.) Trin. ex Steud. subsp. *australis*

FIGURE 155

Phragmites australis (Cav.) Trin. ex Steud., Nomencl. Bot. (ed. 2) 1: 143. 1840. subsp. *australis**.
Common names: common reed, wild reed.

Caespitose or solitary perennials, usually forming extensive colonies; rhizomes elongated. Culms 1–4 m long, erect, reedlike. Leaves cauline; sheaths loose, glabrous; ligules 1 mm long, ciliate membranes; blades 15–40 cm long, 2–4 cm wide, deciduous at the ligule, linear, flat, surfaces and margins glabrous, apex attenuate, filiform. Panicles 15–35 cm long, 8–20 cm wide, open, oblong, dense. Spikelets 3–10 mm long, cuneate, laterally compressed; rachilla segments sericeous; lemmas awnless.

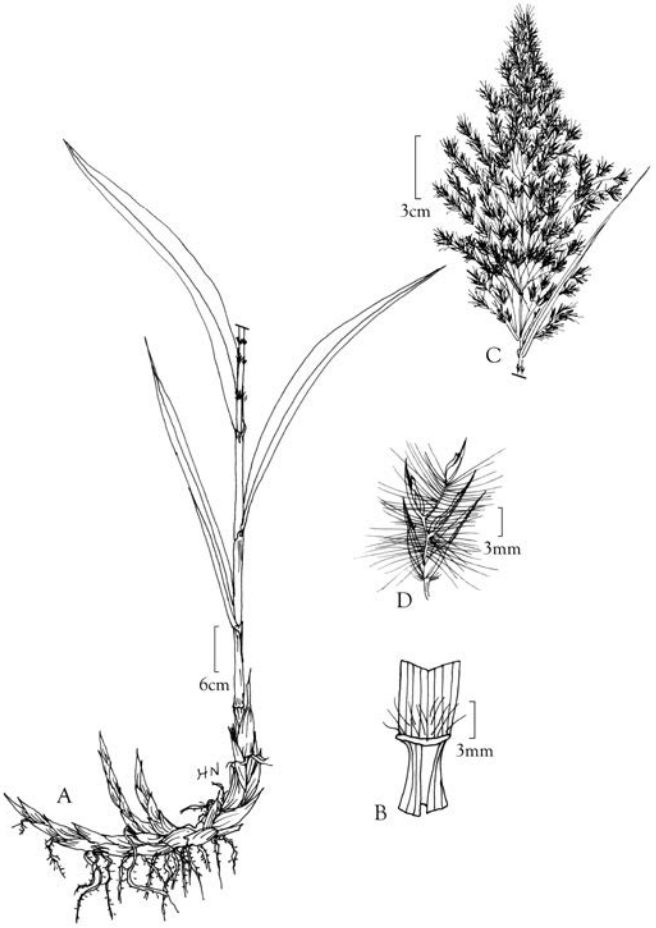

FIGURE 155. *Phragmites australis* subsp. *australis*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Fosberg 24808* (US-2681778); D. modified from Barkworth et al. (2003).

148. *Piptochaetium avenaceum* (L.) Parodi

FIGURE 156

Piptochaetium avenaceum (L.) Parodi, Revista Mus. La Plata, Secc. Bot. 6(25): 229. 1944.

Common names: black oatgrass, blackseed needlegrass, blackseed spear grass.

Caespitose perennials. Culms (30–)40–100 cm tall, erect, slender; internodes distally glabrous; nodes narrowed, yellowish to reddish, glabrous. Leaves mostly basal; sheaths glabrous or sparsely hairy; ligules 2–4 mm long, eciliate membranes, rounded, sometimes highest at the sides, apex acute; blades 8–30 cm long, 0.6–3 mm wide, filiform, flat or involute, surfaces and margins scabrous; apex acute. Panicles 7–25 cm long, open, elliptic. Spikelets 10–15 mm long, lanceolate, subterete; principal lemma awns 35–70 mm long, geniculate or twice geniculate, basal segment hispid, twisted.

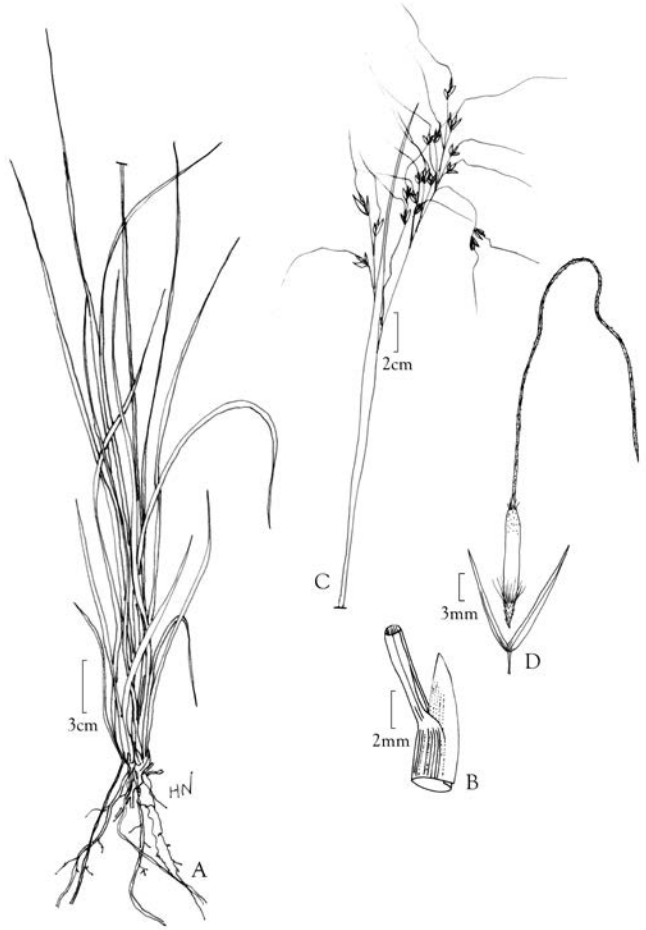

FIGURE 156. *Piptochaetium avenaceum*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Hitchcock 12572* (US-3151067).

149. *Pleioblastus argenteostriatus** fo. *glaber* (Makino) Murata

FIGURE 157

*Pleioblastus argenteostriatus** fo. *glaber* (Makino) Murata, Acta Phytotax. Geobot. 30(4–6): 147. 1979.

Common name: dwarf bamboo.

Caespitose perennials; rhizomes elongated. Culms 40–60 cm tall, branched or unbranched and antrorsely fringed on branched culms, the branched culms (5–10) erect and often recurved at the apex, yellow green, nodes slightly swollen, glabrous. Leaves cauline; sheaths infrequently tubular, purplish at the apex, glabrous, margins ciliate; oral setae present; ligules 0.5 mm long, eciliate membranes or lines of hairs; blades 10–23 cm long, 8–25 mm wide, lanceolate, flat, sometimes with cross-connecting veinlets, surfaces glabrous or puberulous, margins scabrous, bases rounded and with short pseudopetioles, apex acuminate.

FIGURE 157. *Pleioblastus argenteostriatus* fo. *glaber*. Habit, herbarium specimen, *Steury & Parrish 120229* (US-3619015).

Panicles 5–11 cm long, open, contracted, or spikelike, terminal or axillary, composed of lax racemes. Spikelets 40–60 mm long, lanceolate, laterally compressed.

150. *Pleioblastus pygmaeus** (Miq.) Nakai

FIGURE 158

Pleioblastus pygmaeus* (Miq.) Nakai, Sci. Educ. (Tokyo) 15(6): 70. 1932.
Common names: pygmy bamboo, dwarf fern-leaf bamboo.

Caespitose perennials; rhizomes elongated. Culms 10–80 cm tall, erect, straight, reedlike, woody, branched or unbranched, fastigiate; internodes glabrous. Leaves cauline; sheaths glabrous or puberulous; oral setae lacking or at least poorly developed; ligules 1 mm long, eciliate or ciliate membrane, apex obtuse; blades 6–18.5 cm long, 10–17 mm wide, flat, oval to lanceolate, green, not variegated in our area, pubescent on both sides, more densely so abaxially where cross veins are evident, midribs evident, margins scabrous, base wedged to rounded and with short pseudopetioles, apex acute to acuminate. Panicles open or contracted and spikelike. Spikelets about 30 mm long, laterally compressed, lemmas and glumes with short dorsal awns.

151. *Poa annua** L.

FIGURE 159

Poa annua* L., Sp. Pl. 1: 68. 1753.
Common names: annual bluegrass, spear grass.

Caespitose annuals, rarely surviving for a second season. Culms 2–20(–45) cm long, erect or geniculately ascending or decumbent, sometimes rooting at the lower nodes; internodes terete, smooth; lateral branches lacking or sparse. Leaves mostly basal; sheaths weekly compressed, glabrous, closed for about 1/3 their length; ligules 0.5–3(–5) mm long, eciliate membranes, apex obtuse to truncate; blades 1–14 cm long, 1–5 mm wide, linear, flat or weakly folded, surfaces smooth, glabrous, margins

FIGURE 158. *Pleioblastus pygmaeus.* Habit, herbarium specimen, *Steury 120308* (US-3619017).

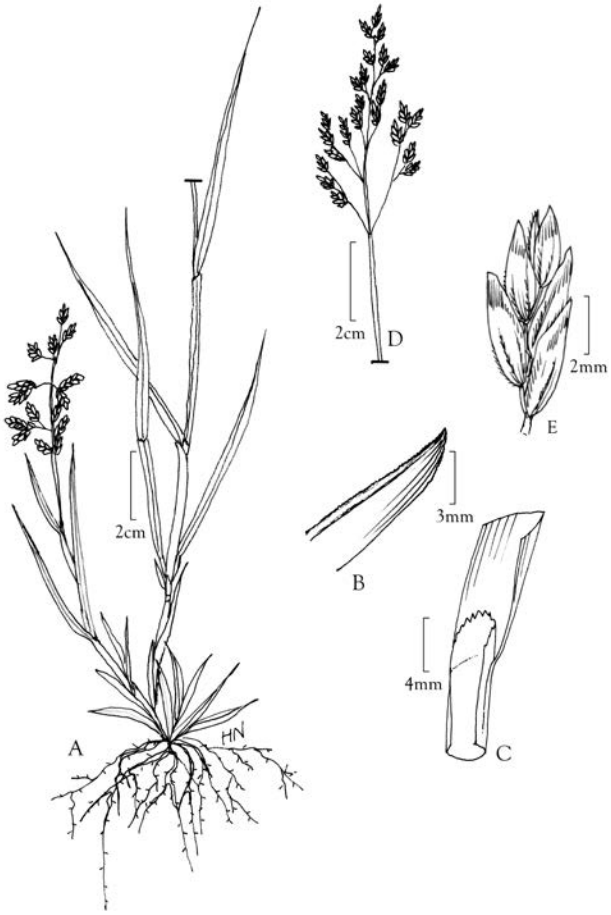

FIGURE 159. *Poa annua.* A. Habit. B. Apex of blade. C. Sheath, ligule, and blade. D. Panicle. E. Florets. A–D drawn from *Fosberg 55144* (US-2681617); E modified from Barkworth et al. (2007).

scaberulous; apex obtuse or abruptly acute, hooded. Panicles 1–7 (–10) cm long, open, pyramidal or ovate. Spikelets 3–5 mm long, oblong or ovate, laterally compressed; callus glabrous; lemmas 2.4–3.4 mm long, margins and lateral veins puberulent, awnless.

152. *Poa autumnalis* Muhl. ex Elliott

FIGURE 160

Poa autumnalis Muhl. ex Elliott, Sketch Bot. S. Carolina 1(2): 159. 1816.
Common name: autumn bluegrass.

Loosely caespitose. Culms 23–86 cm tall, weak; internodes smooth; lateral branches lacking. Leaves mostly basal; sheaths smooth, glabrous; ligules 0.8–1.8 mm long, eciliate membranes, apex lacerate; blades 5–20 cm long, 1–4.5 mm wide, flaccid, linear, flat or folded, surfaces and margins glabrous, apex mostly acute. Panicles 8–18 cm long, open, pyramidal. Spikelets 5–7 mm long, oblong, laterally compressed, clustered toward the branch tips; callus glabrous to short-webbed; callus glabrous to short-webbed; lemmas 3.2–4.4 mm long, keels and marginal veins softly puberulent, awnless.

153. *Poa compressa** L.

FIGURE 161

Poa compressa* L., Sp. Pl. 1: 69. 1753.
Common names: Canada bluegrass, flat-stemmed bluegrass.

Culms solitary or loosely caespitose perennials; rhizomes elongated. Culms 15–60 cm tall, erect or geniculately ascending, wiry; internodes elliptical in section, smooth; butt sheaths glabrous. Leaves basal and cauline; sheaths closed for 1/3–1/2 their length, distinctly compressed, blue green, glabrous; ligules 1–3 mm long, eciliate membranes, apex truncate to obtuse; blades 2–12 cm long, 1.5–4 mm wide, linear, flat or conduplicate, thin, surfaces and margins smooth or scaberulous, glabrous, apex abruptly acute. Panicles 2–10 cm long, 0.5–3 cm wide, open or contracted, oblong

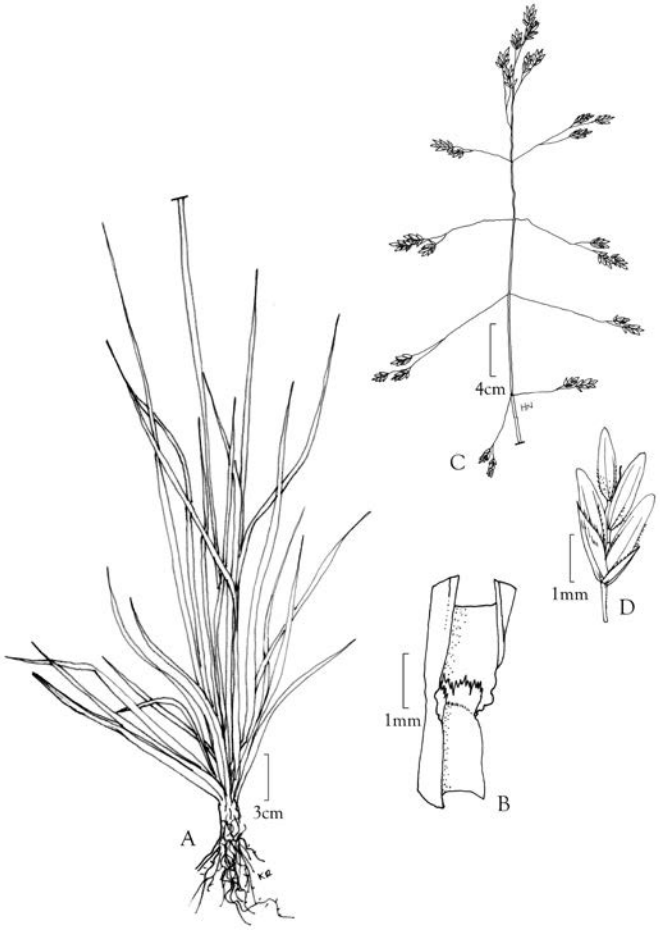

FIGURE 160. *Poa autumnalis*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Fosberg 60907* (US-3343457); D modified from Barkworth et al. (2007).

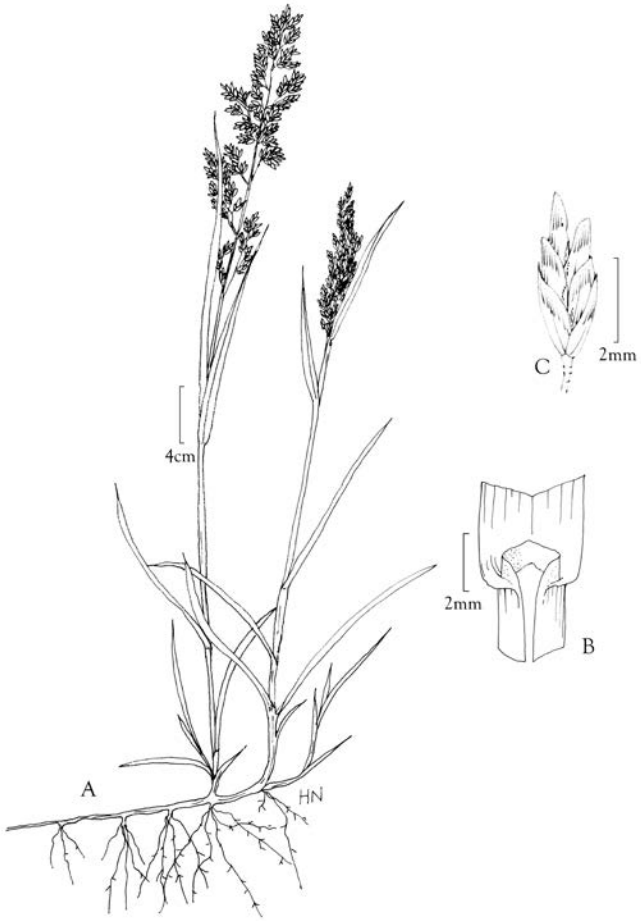

FIGURE 161. *Poa compressa*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Fosberg 42505* (US-2701175) and *34676* (US-2681124); C modified from Barkworth et al. (2007).

or ovate, dense or loose. Spikelets (2.3–)3.5–7 mm long, oblong, laterally compressed; callus usually webbed; lemmas 2.3–3.5 mm long, keels and lateral veins short-villous, awnless.

154. *Poa cuspidata* Nutt.

FIGURE 162

Poa cuspidata Nutt., Comp. Fl. Philadelph. 1: 61. 1818.
Common names: early bluegrass, short-leaved bluegrass.

Caespitose perennials, clumped loosely; rhizomes short. Culms 15–60 cm tall, erect, compressed; internodes glabrous; basal branching mainly extravaginal. Leaves mostly basal; sheaths glabrous, closed for about 1/2 their length, slightly compressed, collars of proximal leaves usually retrorsely scabrid or pubescent distally and on the throat; ligules 0.5–4 mm long, eciliate membranes, apex truncate to acute; blades 30–50 cm long, 1–4 mm wide, linear, flat, surfaces and margins smooth, apex abruptly acute. Panicles 5–15 cm long, open, pyramidal, dense or loose, branches spreading to reflexed. Spikelets 5–8 mm long, ovate, laterally compressed, with hairs extending 6–8 mm beyond apex, clustered toward branch tips; callus webbed with hairs more than 1/3 as long as lemma; lemmas 3–6 mm long, keel and marginal veins short to long-villous, awnless.

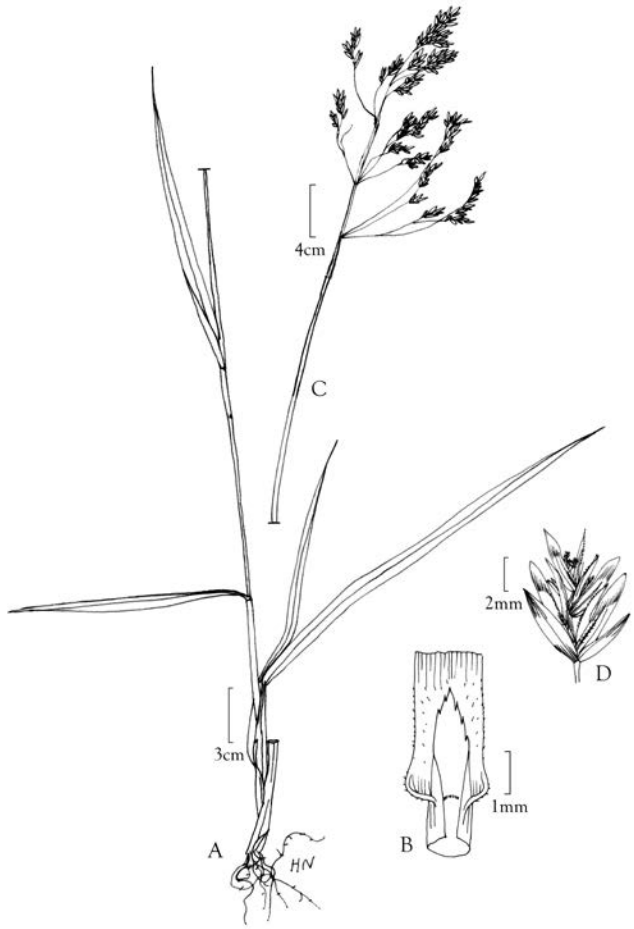

FIGURE 162. *Poa cuspidata*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Dewey 188* (US-491699) and *Degnan 99* (US-1839996); D modified from Barkworth et al. (2007).

155. *Poa palustris* L.

FIGURE 163

Poa palustris L., Syst. Nat. (ed. 10) 2: 874. 1759.
Common names: fowl bluegrass, fowl meadow grass.

Caespitose perennials. Culms 25–120 cm tall, erect or geniculately ascending or decumbent; internodes terete or weakly compressed, smooth; nodes terete or slightly compressed; sometimes branching above the base. Leaves mostly basal; sheaths closed for 1/5 their length, slightly compressed, glabrous or sparsely retrorsely scabrous; ligules (1–)1.5–6 mm long, eciliate membranes, apex obtuse or acute, frequently lacerate; blades 5–20 cm long, 1.5–8 mm wide, flaccid, linear, flat, steeply ascending or spreading, surfaces scaberulous, glabrous, margins

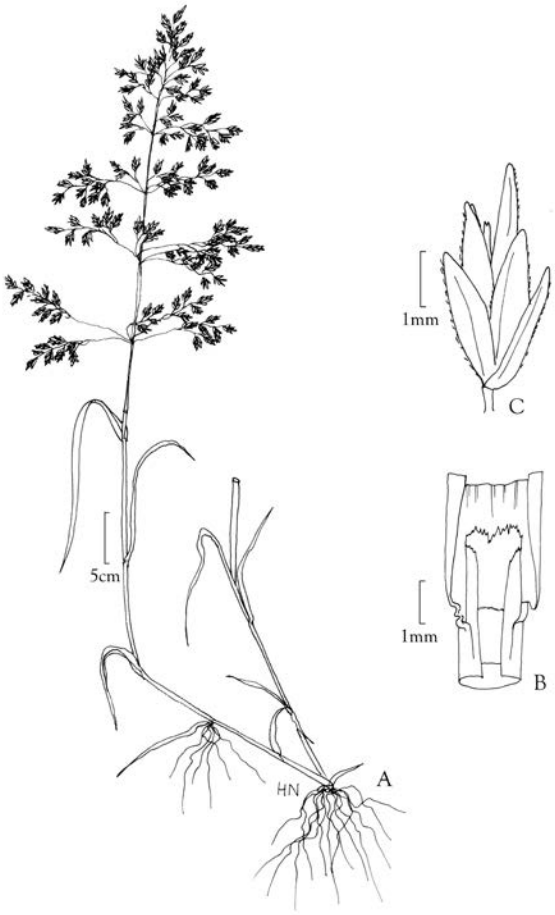

FIGURE 163. *Poa palustris*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Steele s.n.* (US-279393); C modified from Hitchcock (1951).

scaberulous, apex abruptly acute. Panicles (9–)13–30(–41) cm long, 5–15 cm wide, open, oblong or ovate, diffuse, equilateral or nodding. Spikelets 3–5 mm long, oblong or ovate, laterally compressed; callus sparsely to moderately densely webbed; lemmas 2–3 mm long, keels and lateral veins short-villous, awnless.

156. *Poa pratensis** L.

FIGURE 164

*Poa pratensis** L., Sp. Pl. 1: 67–68. 1753.
Common names: Kentucky bluegrass, June grass, spear grass.

Caespitose perennials; rhizomes elongated. Culms 5–70 (–100) cm tall, erect or geniculately ascending; not branching above the base; internodes compressed, smooth; nodes terete or weakly compressed. Leaves mostly basal; sheaths closed 1/4–1/2 of their length, slightly compressed, glabrous or infrequently sparsely hairy; collars smooth, glabrous; ligules 0.9–2(–3.1) mm long, eciliate membranes, apex truncate to rounded; blades 5–30 cm long, 0.4–4.5 mm wide, linear, flat or folded, surfaces smooth or scaberulous, glabrous or pubescent (rarely) to sparsely hairy, margins scaberulous, apex abruptly acute, hooded. Panicles 2–15(–20) cm long, 1–12 cm wide, open or contracted, oblong or pyramidal or ovate, dense or loose. Spikelets 3.5–6(–7) mm long, oblong or ovate, laterally compressed; callus webbed; lemmas 2.8–4.3 mm long, keels and marginal veins long-villous, awnless.

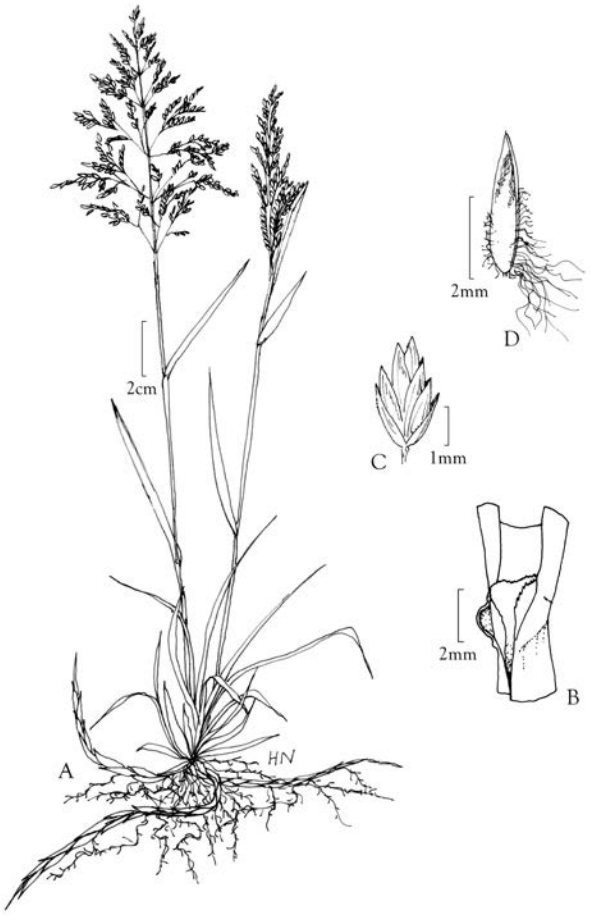

FIGURE 164. *Poa pratensis*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. D. Floret. A, B drawn from *Stone 62* (US-2145953) and *Hitchcock 12666* (US-3151049); C, D modified from Hitchcock (1951).

157. *Poa sylvestris* A. Gray

FIGURE 165

Poa sylvestris A. Gray, Manual 596. 1848.
Common names: forest bluegrass, sylvan bluegrass, woodland bluegrass.

Caespitose perennials. Culms 30–120 cm tall; internodes slightly compressed, smooth; basal innovations usually extravaginal. Leaves mostly basal; sheaths, closed 1/20–7/8 of their length, smooth, glabrous or pubescent; ligules 0.5–2.7 mm long, eciliate

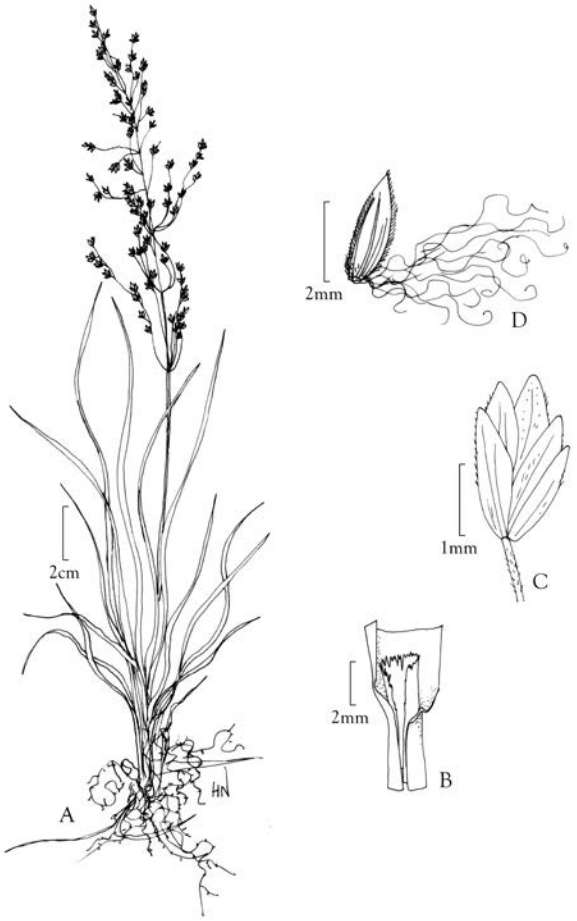

FIGURE 165. *Poa sylvestris*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. D. Floret. A, B drawn from *Pollard 189* (US-260122); C modified from Barkworth et al. (2007); D modified from Hitchcock (1951).

membranes, apex truncate to obtuse; blades 0.7–5 mm wide, flaccid, linear, flat, thin, surfaces and margins glabrous, apex acute. Panicles (6.7–)9–20 cm long, open, ovate. Spikelets 2.5–4.4 mm long, oblong, laterally compressed; callus webbed; lemmas 2.1–3.1 mm long, keel, marginal, and lateral veins short-villous, usually sparsely soft puberulent between the veins, awnless.

158. *Poa trivialis** L.

FIGURE 166

*Poa trivialis** L., Sp. Pl. 1: 67. 1753.
Common names: meadow grass, rough bluegrass, rough-stemmed bluegrass.

Caespitose perennials, short-lived; stolons present. Culms 25–120 cm tall, erect, weak or geniculately ascending or decumbent, sometimes trailing and rooting at nodes; internodes terete or slightly compressed, smooth. Leaves mostly basal; sheaths compressed, antrorsely scabrous, closed 1/3–1/2 of their length; collars glabrous or scabrous; ligules 3–10 mm long, eciliate membranes, apex acute to acuminate; blades 3–20 cm long, 1.5–6 mm wide, linear, flat, surfaces smooth or scaberulous, glabrous, lax, margins scabrous, apex abruptly acute, hardened. Panicles 8–25 cm long, 1–15 cm wide, open or contracted, oblong or ovate, dense or loose or diffuse, equilateral or nodding. Spikelets 2.3–3.5 mm long, elliptic or oblong or ovate, laterally compressed; callus webbed with hairs more than 2/3 as long as lemma; lemmas 2–3.5 mm long, keels sparsely puberulent, marginal veins usually glabrous, awnless.

159. *Schizachyrium scoparium* (Michx.) Nash

FIGURE 167

Schizachyrium scoparium (Michx.) Nash, Fl. S.E. U.S. 59. 1903.
Common names: little bluestem, little false bluestem.

Loosely or densely caespitose perennials; rhizomes absent or short. Culms 50–210 cm tall; lateral branches ample. Leaves

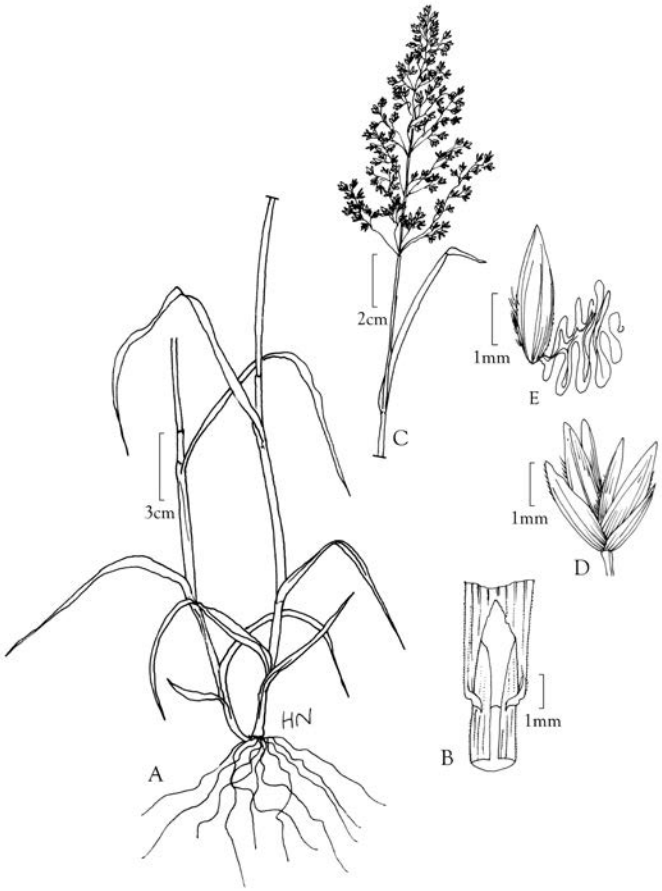

FIGURE 166. *Poa trivialis*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. E. Floret. A–C drawn from *Morton 1658* (US-1870605) and *Kearney s.n.* (US-36144081); D modified from Barkworth et al. (2007).

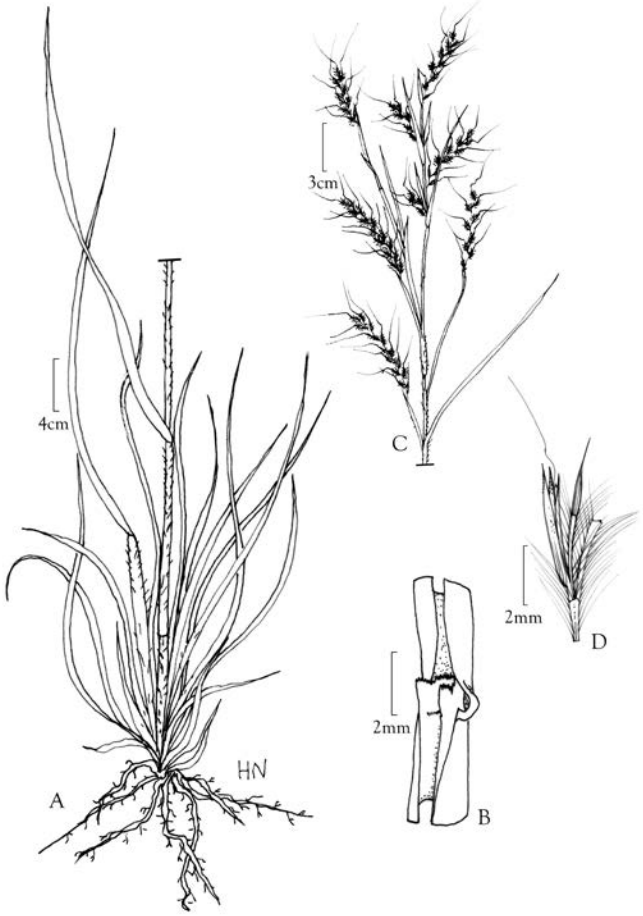

FIGURE 167. *Schizachyrium scoparium*. A. Habit. B. Sheath, ligule, and blade. C. Inflorescence. D. Spikelet pair. A–C drawn from *Chase 2748* (US-740522); D modified from Barkworth et al. (2003).

mostly basal; sheaths keeled or rounded, glabrous to villous, sometimes glaucous; ligules 0.5–2 mm long, eciliate membranes, apex erose; blades 7–105 cm long, 1.5–9 mm wide, linear, flat, green or glaucous, surfaces glabrous to hirsute, margins scabrous, apex acute. Rames solitary, occasionally 2 on each peduncle; each rame 2.5–8 cm long, partially to completely exserted, subtended by a spatheole 4–6 cm long. Fertile sessile spikelets 3–11 mm long, lanceolate, dorsally compressed; pedicelled spikelets 0.7–10 mm long, sterile or staminate; principal lemma awns 6–11(–17) mm long, from a sinus, geniculate, with twisted column.

160. *Secale cereale** L.

FIGURE 168

*Secale cereale** L., Sp. Pl. 1: 84. 1753.
Common name: rye.

Caespitose annuals or biennial. Culms (35–)50–120(–300) cm tall, 6–7-noded. Leaves basal and cauline; sheaths glabrous or hirsute, auricles falcate; ligules 1 mm long, eciliate membranes, apex truncate; blades 10–20 cm long, (3–)4–12 mm wide, linear, flat, surfaces glabrous or sparsely pilose, margins glabrous, apex acute. Spikes (2–)4.5–12(–19) cm long, single, bilateral. Spikelets 12–15 mm long, cuneate, laterally compressed, packed broadside to the rachis; lemmas 12–18 mm long, pectinate-ciliate on the keels, awns 20–50 mm long.

161. *Setaria faberi** R. A. W. Herrm.

FIGURE 169

*Setaria faberi** R. A. W. Herrm., Beitr. Biol. Pflanzen 10(1): 51. 1910.
Common names: Japanese bristle grass, giant foxtail grass, nodding foxtail grass.

Solitary annuals. Culms 50–200 cm tall, geniculately ascending, rooting from lower nodes; lateral branches ample. Leaves cauline; sheaths glabrous, outer margins hairy; ligules 1–2 mm long, fringe of hairs; blades 15–30 cm long, 10–20 mm wide, linear, flat, surfaces strigose above, puberulent below, margins

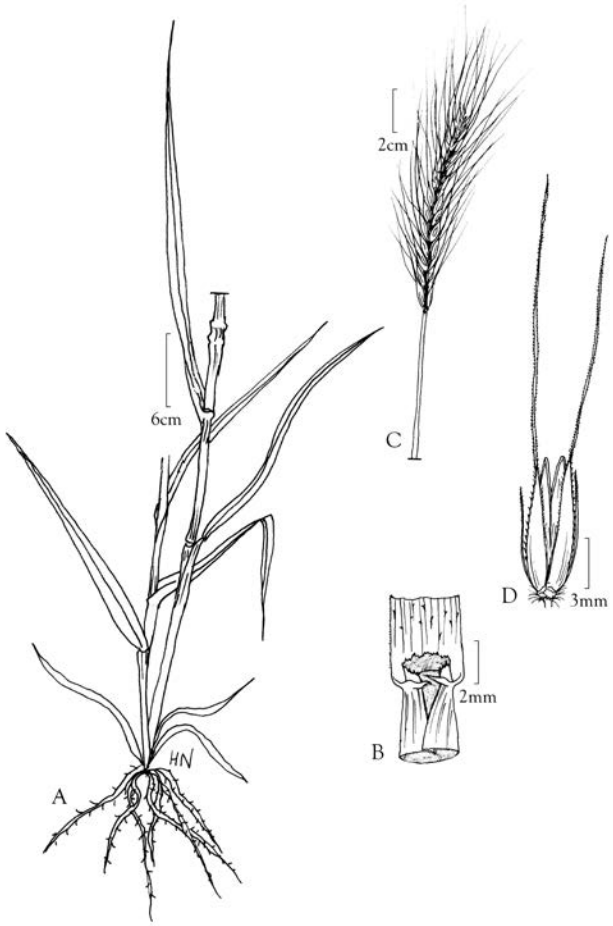

FIGURE 168. *Secale cereale*. A. Base of culm. B. Sheath, ligule, and blade. C. Spike. D. Spikelet. A–C drawn from *Kearney s.n.* (US-1018252); D modified from Hitchcock (1951).

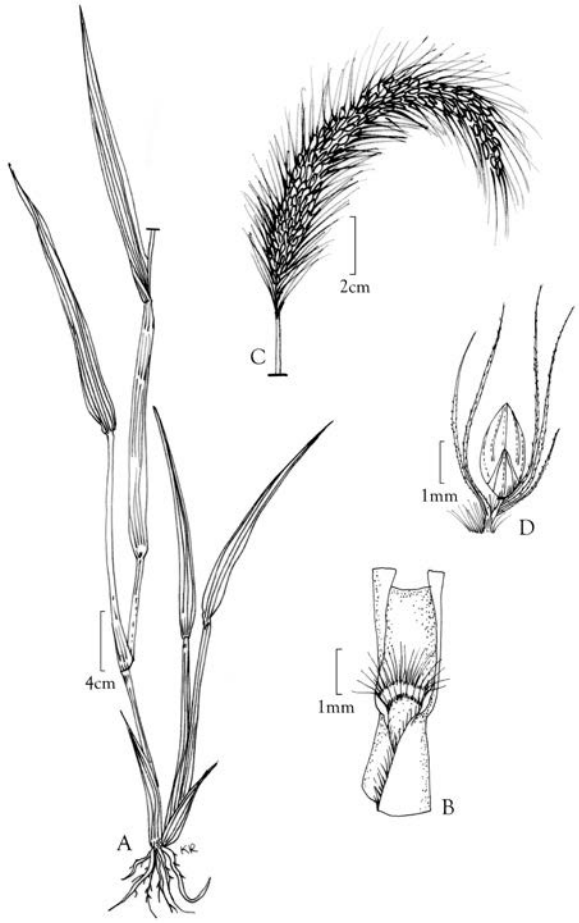

FIGURE 169. *Setaria faberi*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Beyersdorfer 220* (US-3047080); D modified from Barkworth et al. (2003).

scabrous, apex attenuate. Panicles 6–20 cm long, 1–2.5 cm wide, spiciform, linear, nodding. Spikelets 2.5–3 mm long, subsessile, ovate, dorsally compressed, each spikelet subtended by (1–)3(–6) bristles; bristles about 10 mm long; lemmas awnless.

162. *Setaria italica** (L.) P. Beauv.

FIGURE 170

*Setaria italica** (L.) P. Beauv., Ess. Agrostogr. 51, 170, 178. 1812.
Common names: foxtail millet, Italian bristle grass.

Caespitose annuals. Culms 10–100 cm tall, erect or geniculately ascending, robust. Leaves basal and cauline; sheaths mostly glabrous, outer margins hairy; ligules 1–2 mm long, fringe of hairs; blades to 20 cm long, 1–3 cm wide, flaccid, linear, flat, surfaces scaberulous, rough adaxially, margins cartilaginous, scaberulous, apex attenuate. Panicles 8–30 cm long, 0.8–2.4 cm wide, spiciform, linear or oblong, continuous or interrupted, equilateral or nodding. Spikelets 2–3 mm long, subsessile, elliptic, dorsally compressed, each spikelet subtended by 1–3 bristles; bristles to 13 mm long; lemmas awnless.

163. *Setaria parviflora* (Poir.) Kerguelen

FIGURE 171

Setaria parviflora (Poir.) Kerguelen, Lejeunia, n.s. 120: 161. 1987.
Common names: knotroot bristle grass, knotroot foxtail grass, perennial foxtail grass.

Caespitose perennials; rhizomes absent or short, knotty. Culms 30–120 cm tall, erect or geniculately ascending; internodes thin walled; nodes glabrous. Leaves basal and cauline; sheaths glabrous, outer margin glabrous, oral hairs ciliate; ligules to 1 mm long, fringe of hairs; blades to 25 cm long, 2–8 mm wide, linear, flat, surface scabrous, rough adaxially, margins scabrous to scaberulous, apex acuminate. Panicles 3–8 cm

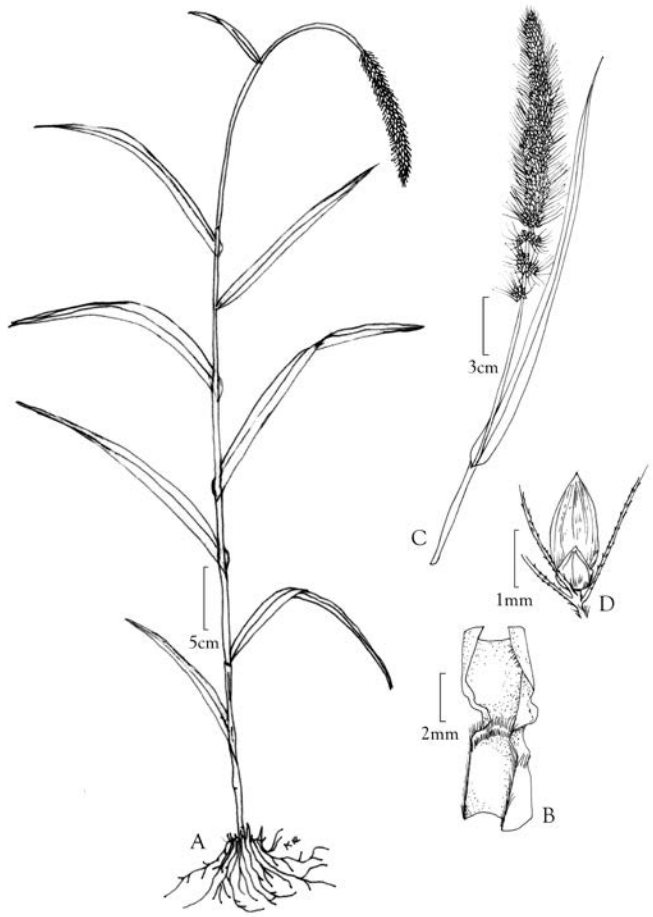

FIGURE 170. *Setaria italica*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Fosberg 36170* (US-2669792); D modified from Barkworth et al. (2003).

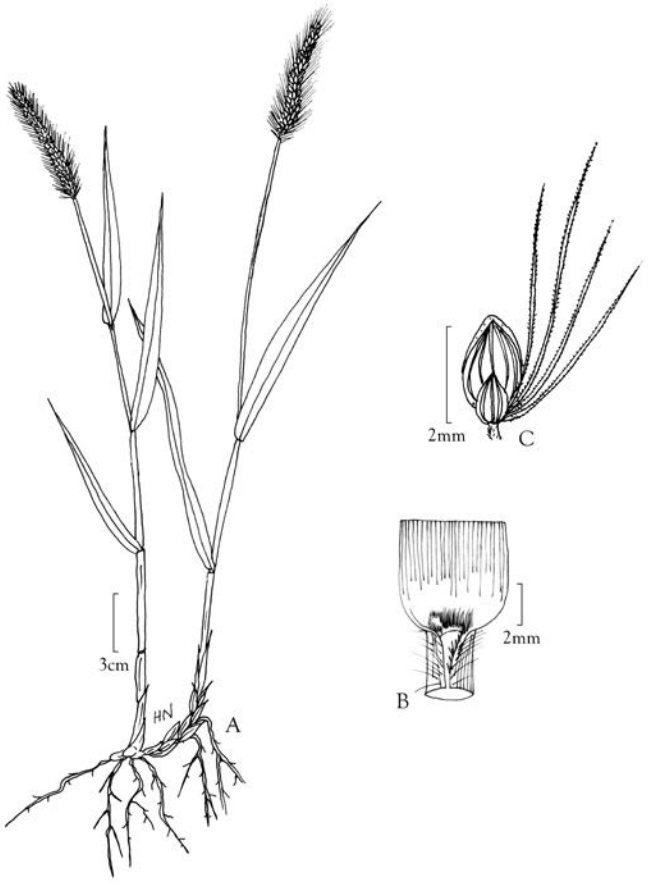

FIGURE 171. *Setaria parviflora*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Leonard 607* (US-2612432); C modified from Barkworth et al. (2003).

long, 0.8–1.4 cm wide, spiciform, linear. Spikelets 2–2.8 mm long, pedicelled, lanceolate, dorsally compressed, each spikelet subtended by 4–12 bristles; bristles 2–12 mm long, antrorsely scabrous; lemmas awnless.

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

FIGURE 172

*Setaria pumila** (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817.
Common name: yellow foxtail grass.

Caespitose annuals. Culms 5–130 cm tall, geniculately ascending; nodes glabrous. Leaves basal and cauline; sheaths glabrous; ligules 1.5 mm long, ciliolate membranes or a fringe of hairs; blades 3–30 cm long, 4–10 mm wide, loosely twisted, linear, flat, upper surfaces sparsely hairy, margins scabrous, apex acute. Panicles 3–15 cm long, 9–19 mm wide, spiciform, linear. Spikelets 2–3.4 mm long, pedicelled, ovate, dorsally gibbous, dorsally compressed, each spikelet subtended by 4–12 bristles; bristles 3–8 mm long, antrorsely scabrous; lemmas awnless.

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

FIGURE 173

*Setaria verticillata** (L.) P. Beauv., Ess. Agrostogr. 51, 171, 178. 1812.
Common names: bur bristle grass, bur foxtail grass, rough bristle grass, rough foxtail grass.

Caespitose annuals. Culms 30–100 cm tall, decumbent; nodes glabrous. Leaves mostly basal; sheath surface glabrous, outer margins glabrous or hairy; ligules to 1mm long, densely ciliate membranes; blades 5–30 cm long, 5–15 mm wide, flaccid, linear, flat, abaxial surfaces scabrous, margins scabrous, apex acute. Panicles 5–15 cm long, 0.5–1.5 cm wide, spiciform, linear, continuous or interrupted. Spikelets 2–2.3 mm long, pedicelled,

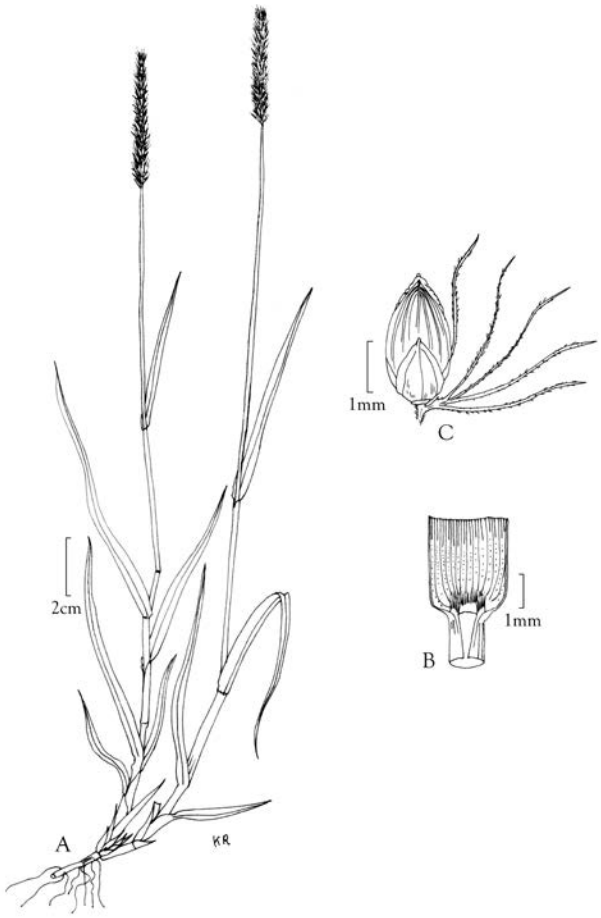

FIGURE 172. *Setaria pumila*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Kanal 753* (US-3268326); C modified from Barkworth et al. (2003).

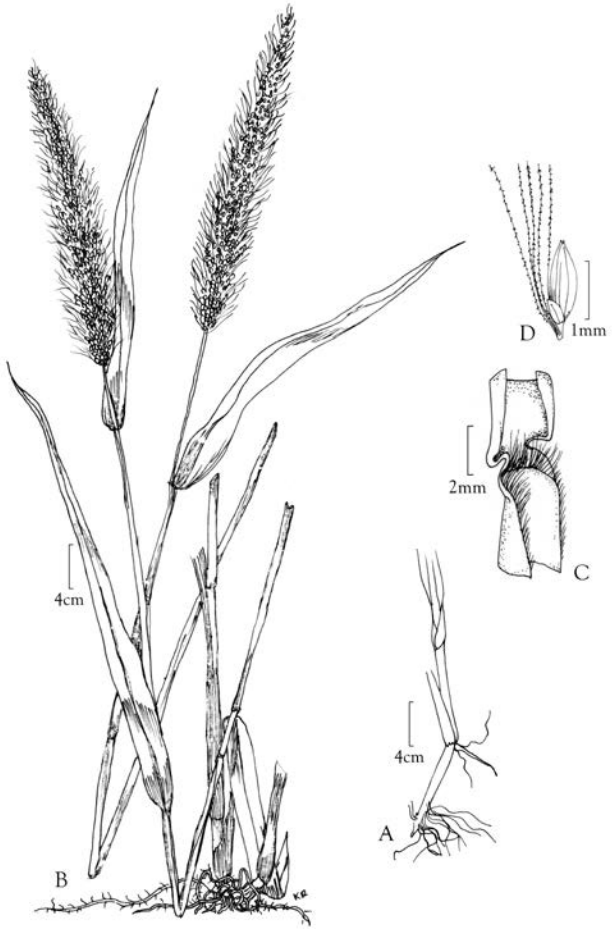

FIGURE 173. *Setaria verticillata*. A. Lower culm with adventitious roots. B. Habit. C. Sheath, ligule, and blade. D. Spikelet. Drawn from *Ward s.n.* (US-825057).

elliptic, dorsally compressed, each spikelet subtended by a solitary bristle; bristles 4–7 mm long, retrorsely scabrous; lemmas awnless.

166. *Setaria viridis** (L.) P. Beauv.

FIGURE 174

Setaria viridis* (L.) P. Beauv., Ess. Agrostogr. 51, 171, 178. 1812.
Common names: green bristle grass, green foxtail grass.

Caespitose annuals. Culms 20–250 cm tall, erect or geniculately ascending; nodes glabrous. Leaves basal and cauline; sheaths glabrous, sometimes scaberulous, outer margins hairy; ligules 1–2 mm long, fringe of hairs; blades to 20 cm long, 4–25 mm wide, linear, flat, scaberulous or glabrous, margins scabrous, apex acute. Panicles 3–20 cm long, 0.4–1 cm wide, spiciform, linear. Spikelets 1.8–2.2 mm long, pedicelled, elliptic, dorsally compressed, obtuse, each spikelet subtended by 1–3 bristles; bristles 5–10 mm long, antrorsely scabrous; lemmas awnless.

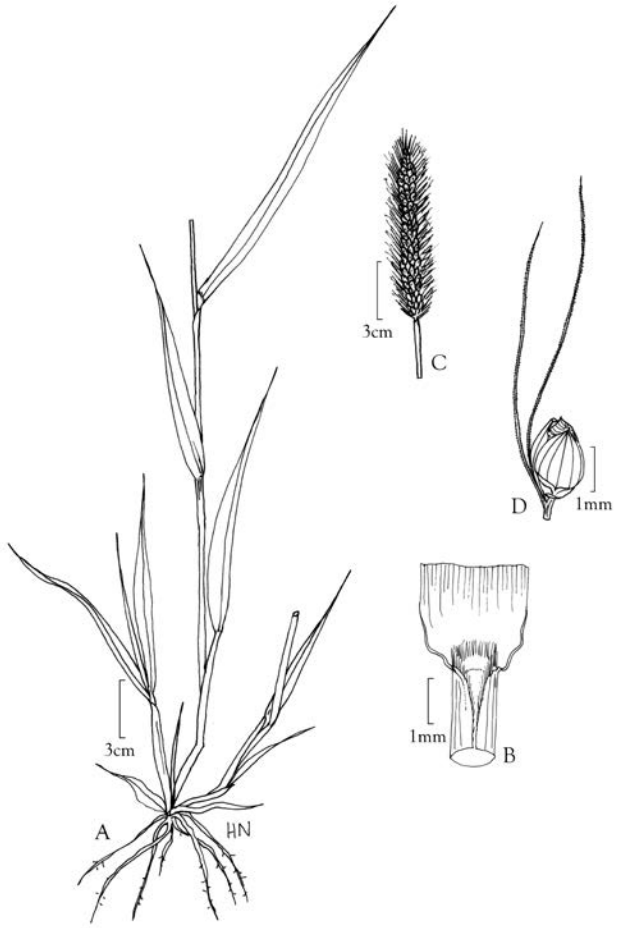

FIGURE 174. *Setaria viridis*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. Drawn from *Kanal 764* (US-3268329).

167. *Sorghastrum nutans* (L.) Nash

FIGURE 175

Sorghastrum nutans (L.) Nash, Fl. S.E. U.S. 66, 1326. 1903.
Common names: Indian grass, yellow Indian grass.

Stout caespitose perennials; rhizomes short, stout, scaly. Culms 50–240 cm tall, 1.5–4.5 mm thick, erect; internodes glabrous. Leaves mostly basal; sheaths glabrous to pilose, auricles erect; ligules 2–6 mm long, eciliate membranes, apex lacerate; blades 10–70 cm long, 1–4 mm wide, linear, flat, glaucous, glabrous or pubescent, margins scabrous, apex attenuate. Panicles 20–75 cm long, open, oblong, loosely contracted; branches tipped by a few spikelets. Fertile spikelets 5–8.7 mm long, lanceolate, sessile, dorsally compressed; pedicelled spikelets absent; principal lemma awns 10–22 mm long overall, from a sinus; geniculate, twisted below.

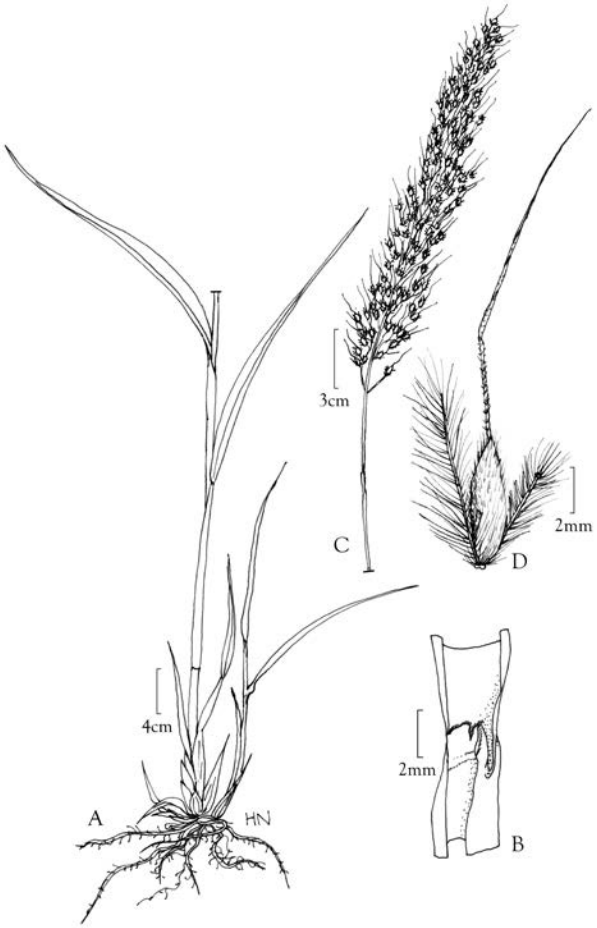

FIGURE 175. *Sorghastrum nutans*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Smith 4925* (US-2181313); D modified from Hitchcock (1951).

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

FIGURE 176

Sorghum bicolor* (L.) Moench, Methodus 207. 1794.
Common names: milo, broom-corn, kafir corn, sorghum, Sudan grass.

Solitary annuals or short-lived perennials. Culms 50–500 cm tall, 1–5 cm thick, sometimes branching at the base, erect, robust; nodes glabrous or appressed pubescent; internodes glabrous. Leaves cauline; sheaths glabrous; ligules 1–4 mm long, ciliate membranes; blades 5–100 cm long, 0.5–10 cm wide, linear, flat, glabrous, margins scabrous, apex acute. Panicles 5–60 cm long, 3–30 cm wide, open or contracted, lanceolate or ovate or globose, equilateral or nodding; branches (rames) tipped by 2–7 spikelet pairs. Fertile spikelets 3–10 mm long, sessile, oblong or ovate or obovate or orbicular, dorsally compressed; pedicelled spikelets staminate or sterile; lemmas unawned or with awns 5–30 mm long from a sinus, geniculate, twisted below.

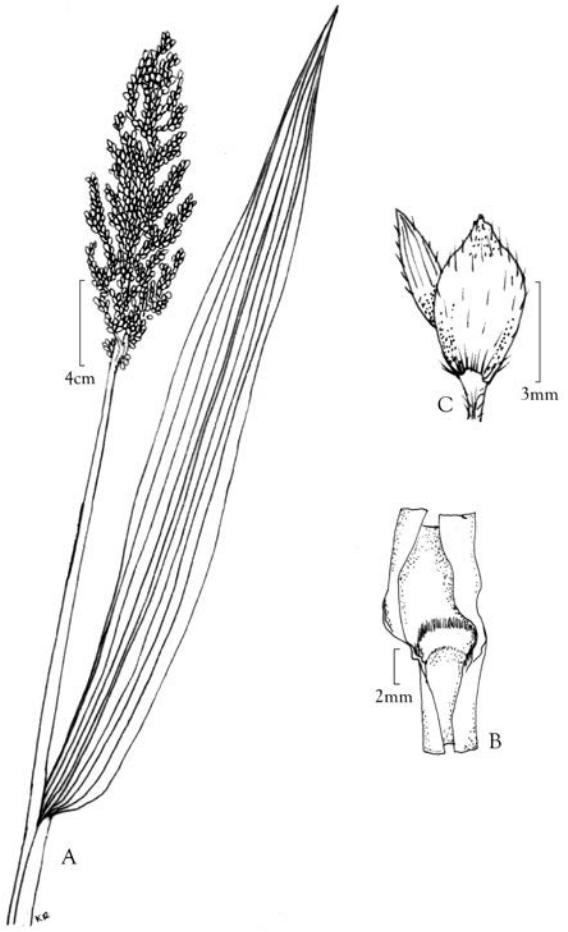

FIGURE 176. *Sorghum bicolor*. A. Panicle. B. Sheath, ligule, and blade. C. Spikelet pair. A, B drawn from *Dewey 161* (US-431586); C modified from Barkworth et al. (2003).

169. *Sorghum halepense** (L.) Pers.

FIGURE 177

Sorghum halepense* (L.) Pers., Syn. Pl. 1: 101. 1805.
Common name: Johnson grass.

Solitary perennials; rhizomes elongated, scaly. Culms 50–200 cm tall, 0.4–2 cm thick, erect or geniculately ascending or decumbent; nodes appressed pubescent; internodes glabrous. Leaves cauline; sheaths glabrous, ribbed; ligules 2–6 mm long, ciliolate membranes; blades 10–90 cm long, 8–40 mm wide, surfaces smooth, lanceolate, linear, flat, margins scaberulous, apex acute. Panicles 10–55 cm long, 3–25 cm wide open, lanceolate or pyramidal; branches (rames) tipped by 1–5 spikelet pairs. Fertile spikelets 4.5–5(–5.5) mm long, sessile, elliptic, dorsally compressed; pedicelled spikelets staminate; lemmas unawned or with awns 10–16 mm long from a sinus, geniculate, twisted below.

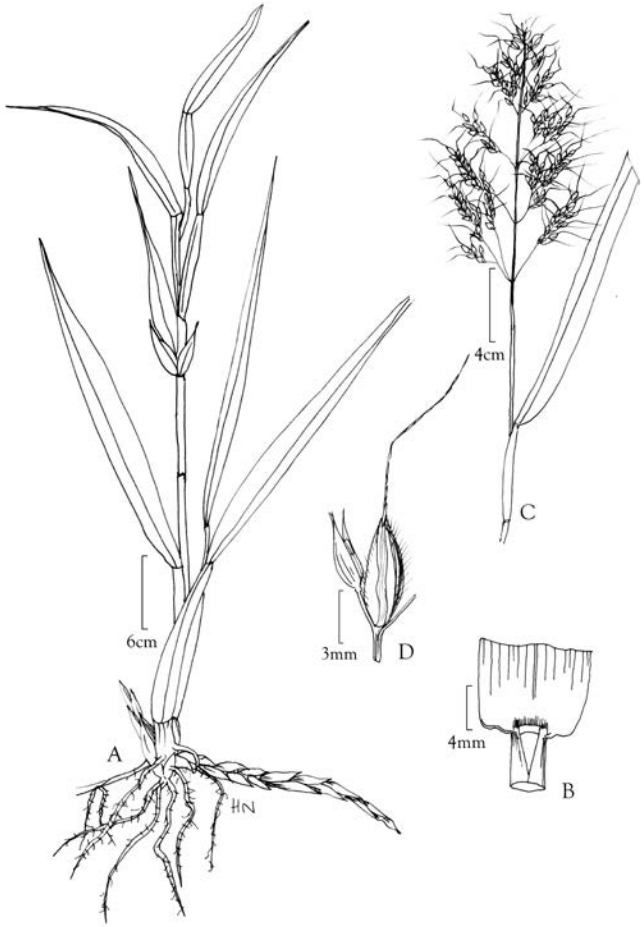

FIGURE 177. *Sorghum halepense*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet pair. A–C drawn from *Fleming 616* (US-3117621); D modified from Barkworth et al. (2003).

170. *Spartina cynosuroides* (L.) Roth

FIGURE 178

Spartina cynosuroides (L.) Roth, Catal. Bot. 3: 10. 1806.
Common names: big cordgrass, salt reed grass.

Solitary perennials; rhizomes elongated, scales closely imbricate. Culms 100–350 cm tall, 1–2 cm thick, erect. Leaves cauline; sheaths smooth or straight, mostly glabrous, lower sheaths often wrinkled; oral hairs lacking or ciliate; ligules 1–3 mm long, fringe of hairs; blades 60–45 cm long, 6–20 mm wide, sometimes involute, linear, flat, glabrous, margins strongly scabrous, apex acuminate. Panicles 15–40 cm long with 5–67 unilateral branches borne along a central axis; branches 6–15 cm long each with 10–70 fertile spikelets; central axis 15–40 cm long. Spikelets 9–14 mm long, 1-flowered, oblong, laterally compressed, packed broadside to the rachis, pectinate and 2-rowed; lower glumes 1/2–2/3 as long as lemma; upper glumes unawned or with awns up to 2 mm long; lemmas awnless.

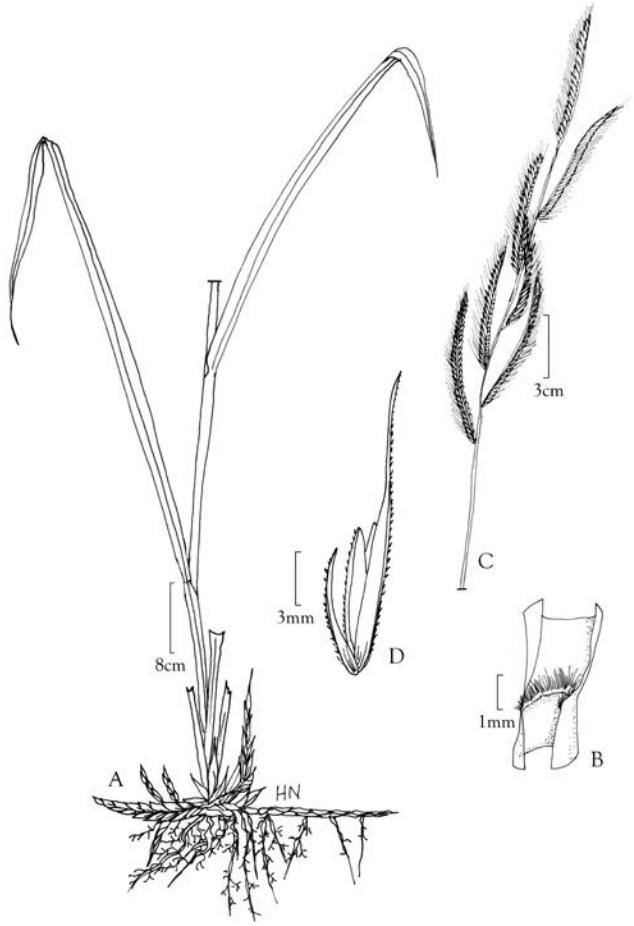

FIGURE 178. *Spartina cynosuroides*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Fosberg 34809* (US-2681776, US-2681777); D modified from Barkworth et al. (2003).

171. *Spartina pectinata* Link

FIGURE 179

Spartina pectinata Link, Jahrb. Gewächsk. 1(3): 92–93. 1820.
Common names: cordgrass, freshwater cordgrass, prairie cordgrass.

Solitary perennials; rhizomes elongated, scaly. Culms 100–250 cm tall, 2.5–11 mm thick, erect. Leaves cauline; sheath mostly glabrous, oral hairs lacking or ciliate; ligules 1–3 mm long, fringe of hairs; blades 20–96 cm long, 5–15 mm wide, linear, flat to involute, glabrous, margins strongly scabrous, apex acuminate. Panicles 10–50 cm long with 5–25 unilateral branches borne along a central axis; branches 1.5–15 cm long, each with 10–80 fertile spikelets; central inflorescence axis 10–50 cm long; spikelet packing broadside to rachis, regular, 2-rowed. Spikelets 10–25 mm long, 1-flowered, pectinate, oblong, laterally compressed, packed broadside to the rachis, 2-rowed; lower glumes 3/4 to as long as lemmas; upper glumes with awns 4–8 mm long; lemmas awnless.

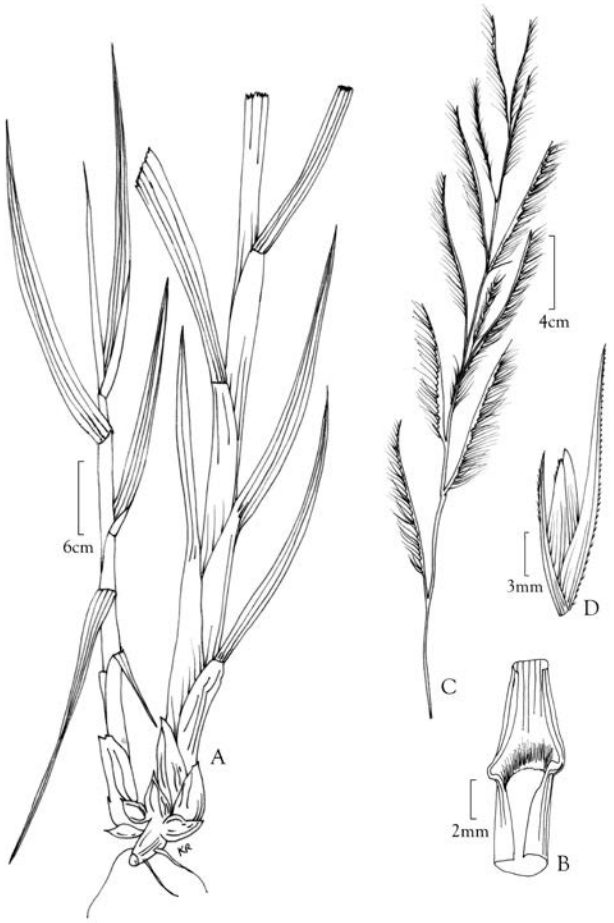

FIGURE 179. *Spartina pectinata*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Steele s.n.* (US-349803); D modified from Hitchcock (1951).

172. *Sphenopholis intermedia* (Rydb.) Rydb.

FIGURE 180

Sphenopholis intermedia (Rydb.) Rydb., Bull. Torrey Bot. Club 36: 533. 1909.
Common names: slender wedge grass, slender wedgescale.

Caespitose perennials. Culms 30–120 cm tall, erect. Leaves basal and cauline; sheaths glabrous or scaberulous, sometimes pubescent; ligules 1.5–2.5 mm long, erose-ciliate membranes; blades 8–15 cm long, (1–)2–6 mm wide, linear, flat to slightly involute, glabrous to sparsely pilose, margins scabrous, apex acute. Panicles (2–)7–20 cm long, (0.5–)1–3 cm wide, open, lanceolate or ovate, dense or loose, nodding. Spikelets 2.1–4 mm long, obovate, laterally compressed; lemmas 2.1–3 mm long, awnless.

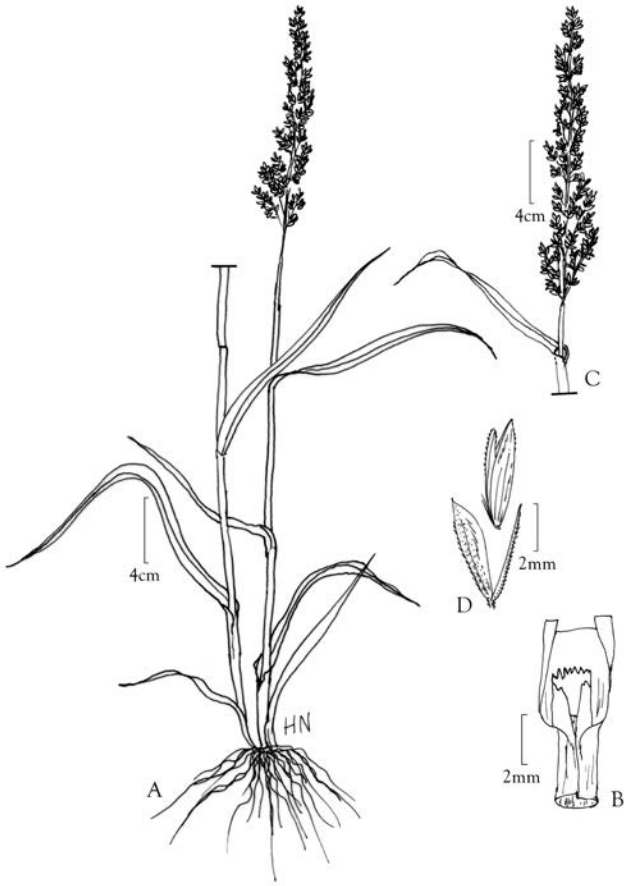

FIGURE 180. *Sphenopholis intermedia*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Donald 133* (US-3557152) and *Swallen 9648* (US-2181188); D modified from Barkworth et al. (2007).

173. *Sphenopholis nitida* (Biehler) Scribn.

FIGURE 181

Sphenopholis nitida (Biehler) Scribn., Rhodora 8(92): 144. 1906.
Common names: shiny wedge grass, shiny wedgescale.

Caespitose perennials. Culms 30–80 cm tall. Leaves cauline; sheaths pubescent at the upper sheaths, otherwise glabrous; ligules 1–2 mm long, eciliate membranes, lacerate; blades 2–15 cm long, (1–)2–5(–7) mm wide, linear, flat to slightly involute, glabrous or pubescent, margins scabrous, apex acute. Panicles 7–20 cm long, 1–5 cm wide, open, oblong, diffuse. Spikelets 2.5–5 mm long, obovate, laterally compressed; lemmas 2.1–3.8 mm long, usually unawned, rarely mucronate.

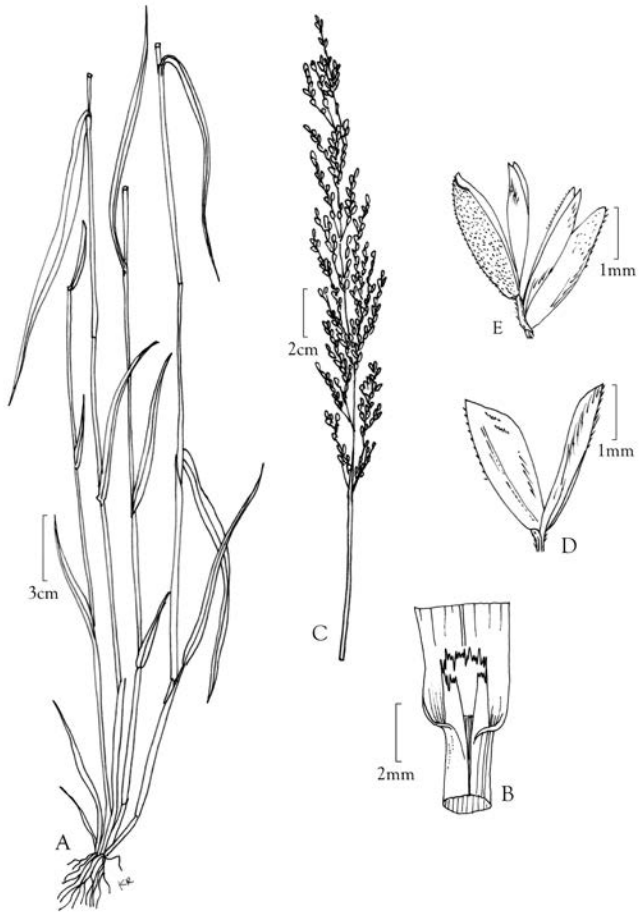

FIGURE 181. *Sphenopholis nitida*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Glumes. E. Florets. A–C drawn from *Allard 8579* (US-1874749) and *Norton 1695* (US-1870617); D, E modified from Hitchcock (1951).

174. *Sphenopholis obtusata* (Michx.) Scribn.

FIGURE 182

Sphenopholis obtusata (Michx.) Scribn., Rhodora 8(92): 144. 1906.

Common names: prairie wedge grass, prairie wedgescale.

Caespitose annuals or perennials; butt sheaths sparsely hairy. Culms (9–)20–130 cm tall. Leaves cauline; sheaths glabrous or hairy, sometimes scaberulous; ligules (1–)1.5–2.5 mm long, erose-ciliate membranes, apex more or less lacerate; basal blades 5–14 cm long, (1–)2–8 mm wide, linear, usually flat, rarely slightly involute, surfaces scabrous or pubescent, margins pubescent, apex acute. Panicles (2–)5–15(–25) cm long, 0.5–2 cm wide, open or contracted, lanceolate. Spikelets 2.2–3.6 mm long, obovate, laterally compressed; lemmas 1.9–2.8 mm long, awnless.

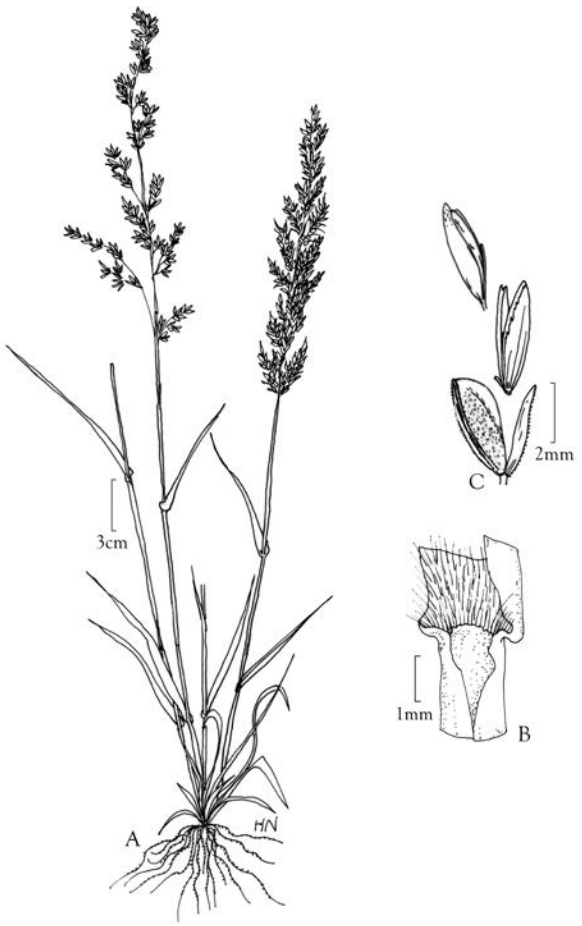

FIGURE 182. *Sphenopholis obtusata*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Hotchkiss 7291* (US-2043989); C modified from Barkworth et al. (2007).

175. *Sporobolus compositus* (Poir.) Merr.

FIGURE 183

Sporobolus compositus (Poir.) Merr., Circ. Div. Agrostol. U.S.D.A. 35: 6. 1901.

Common names: headlike dropseed, tall dropseed, rough dropseed.

Solitary or caespitose perennials; rhizomes absent or elongated, scaly. Culms (20–)30–130(–150) cm tall, erect. Leaves basal and cauline; sheaths glabrous with hairy apices; ligules 0.1–0.5 mm long, fringe of hairs; blades 5–70 cm long, 0.5–10 mm wide, not conspicuously distichous, linear, flat, conduplicate or involute, glabrous or pilose, margins glabrous, apex acute. Panicles 5–30 cm long, 0.4–1.6 cm wide, spiciform, linear, dense or loose, terminal and axillary, partially included in the uppermost sheath. Spikelets 4–6(–10) mm long, lanceolate, subterete,

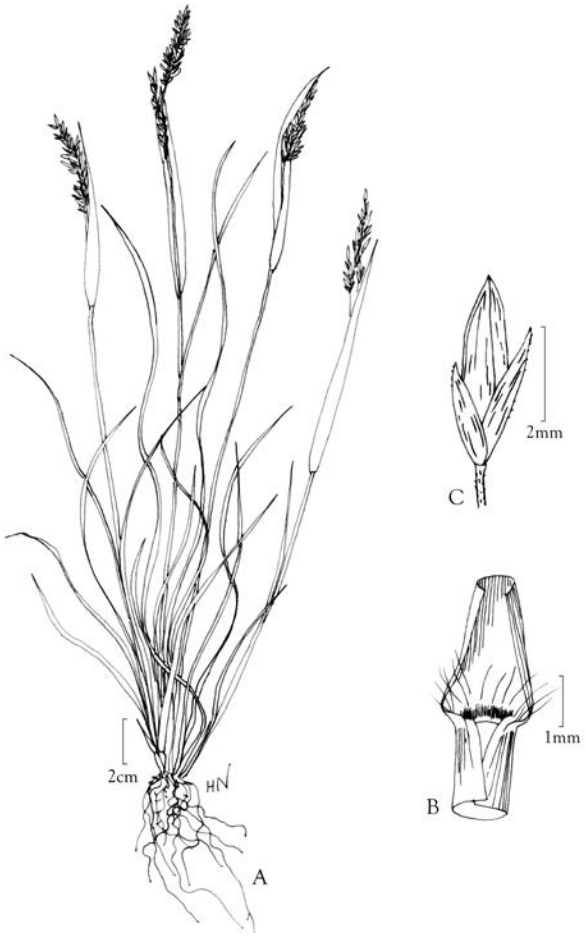

FIGURE 183. *Sporobolus compositus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Dewey 402* (US-431575); C modified from Barkworth et al. (2003).

1-flowered; lemmas glabrous and smooth, awnless; caryopsis outer wall gelatinous when wet.

176. *Sporobolus neglectus* Nash

FIGURE 184

Sp*orobolus neglectus* Nash, Bull. Torrey Bot. Club 22(11): 464. 1895.
Common name: small dropseed.

Caespitose annuals. Culms 10–45 cm tall, erect or geniculately ascending, delicate, slender, wiry. Leaves mostly basal; sheaths inflated, glabrous; ligules 0.1–0.3 mm long, fringe of hairs; blades 1–12 cm long, 0.6–2 mm wide, linear, flat, involute at the tip, glabrous abaxially, scaberulous adaxially, margins glabrous or scaberulous, apex attenuate. Panicles 2–5 cm long, 0.2–0.5 cm wide, contracted, linear, terminal and axillary, included in the uppermost sheaths. Spikelets 1.6–3 mm long, lanceolate, subterete, 1-flowered; lemmas glabrous, awnless.

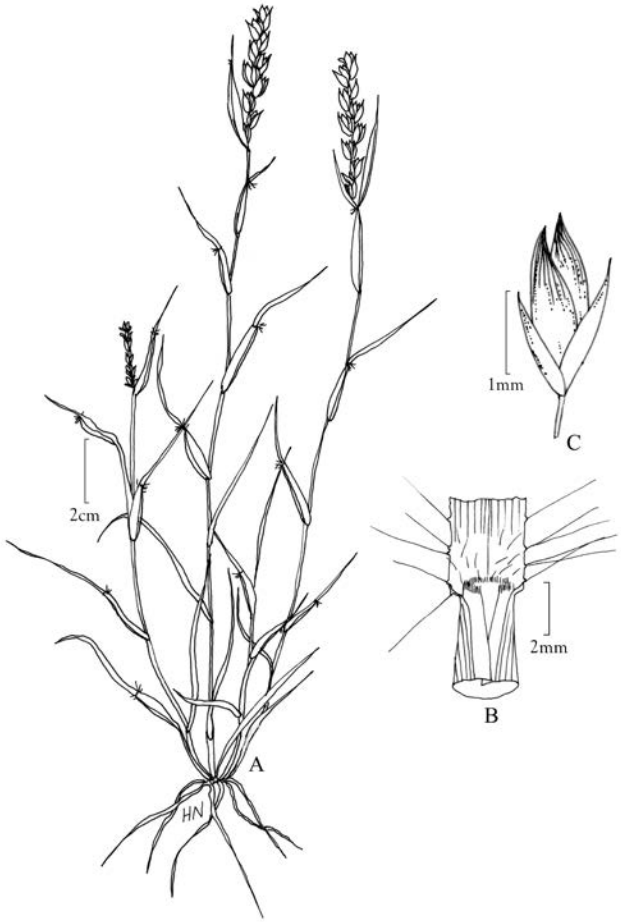

FIGURE 184. *Sporobolus neglectus*. A. Habit. B. Sheath, ligule, and blade. C. Spikelet. A, B drawn from *Steele s.n.* (US-431580); C modified from Barkworth et al. (2003).

177. *Sporobolus vaginiflorus* (Torr. ex A. Gray) Alph. Wood

FIGURE 185

Sporobolus vaginiflorus (Torr. ex A. Gray) Alph. Wood, Class-book Bot. (ed. 1861) 775. 1861.
Common names: poverty dropseed, poverty grass.

Caespitose annuals, delicate. Culms 15–60(–70) cm tall, erect, wiry, scabrous. Leaves basal and cauline; sheaths often inflated, sometimes sparsely hairy at summit; ligules to 3 mm long, fringe of hairs; blades 2–12(–25) cm long, 1–2 mm wide, linear, flat or involute at the tips, glabrous or pilose, margins scaberulous or glabrous, apex acute. Panicles 1–5 cm long, 0.2–0.5 cm

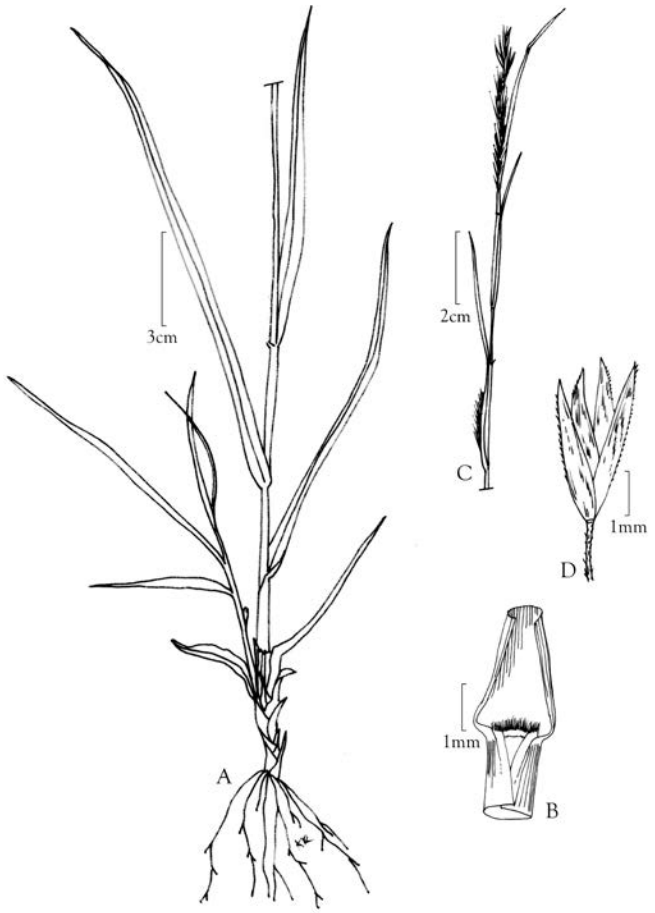

FIGURE 185. *Sporobolus vaginiflorus*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Kanal 077* (US-3075178) and *Leonard 5711* (US-2160824); D modified from Barkworth et al. (2003).

wide, contracted, linear, terminal and axillary, enclosed in the uppermost sheath. Spikelets 2.3–6 mm long, lanceolate, laterally compressed; lemmas strigose, awnless.

178. *Tridens flavus* (L.) Hitchc. var. *flavus*

FIGURE 186

Tridens flavus (L.) Hitchc. var. ***flavus***, Rhodora 8(95): 210. 1906.
Common names: purpletop, tall redtop.

Caespitose perennials; rhizomes short, knotty. Culms 60–180 cm tall, erect. Leaves basal and cauline; sheaths keeled, glabrous below, pubescent near summit; collars pubescent; ligules to 0.5 mm long, fringe of hairs; blades 10–50 cm long, 3–10 mm wide, linear, flat, glabrous or sparsely hispid, margins scabrous, apex attenuate and involute. Panicles 15–40 cm long, 3–30 cm wide, open, ovate; branches divergent to drooping. Spikelets 5–10 mm long, oblong, laterally compressed; lemmas awnless.

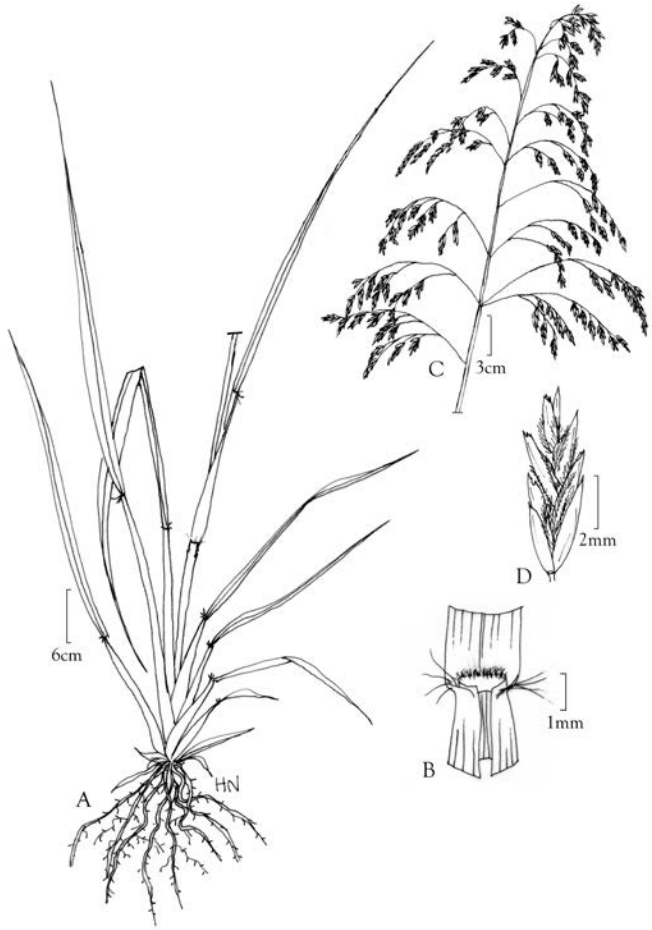

FIGURE 186. *Tridens flavus* var. *flavus*. A. Habit. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Fosberg 55972* (US-2773636) and *Allard 22297* (US-2919277); D modified from Hitchcock (1951).

179. *Tripidium ravennae** (L.) H. Scholz

FIGURE 187

Tripidium ravennae* (L.) H. Scholz, Willdenowia 36(2): 664. 2006. [Syn. *Saccharum ravennae* (L.) L.]
Common names: plume grass, Ravenna grass.

Caespitose perennials; butt sheaths glabrous. Culms 100–450 cm tall, erect; internodes solid. Leaves cauline; sheaths glabrous; ligules 0.6–1.1 mm long, ciliate membranes; blades 50–100 cm long, 4–14 mm wide, linear, flat, surfaces glabrous, margins scabrous, bases tapering to the midrib, apex acute. Panicles 25–70 cm long, open, elliptic, primary branches (rames) 6–20 cm long. Spikelets 3–6(–6.5) mm long, in pairs; fertile spikelets elliptic, dorsally compressed, acuminate; principal lemma awns

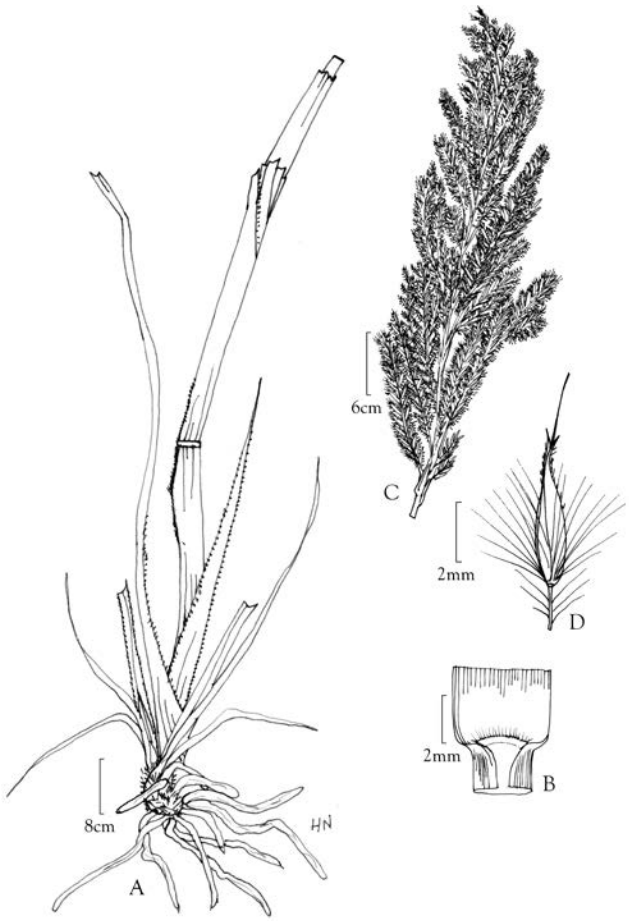

FIGURE 187. *Tripidium ravennae*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Spikelet. A–C drawn from *Steury 001016.1* (US-3376334); D modified from Barkworth et al. (2003).

2.5–5 mm long, apical, straight or curved at the base, clearly exserted from spikelet; anthers 3.

180. *Tripsacum dactyloides* (L.) L.

FIGURE 188

Tripsacum dactyloides (L.) L., Syst. Nat. (ed. 10) 1261. 1759.
Common name: eastern gama grass.

Caespitose perennials; plants monoecious; rhizomes short, knotty; butt sheaths, sparsely hairy or pilose. Culms 150–400 cm tall, erect or geniculately ascending, robust or of moderate stature, with prop roots; internodes solid. Leaves basal and cauline; sheaths glabrous, occasionally pilose; ligules 1 mm long, ciliolate membranes; blades 30–75(–120) cm long, 18–60 mm wide, scaberulous, rough adaxially, glabrous, margins scabrous, apex attenuate. Panicles with 1–6 branches, subdigitate to racemosely arranged, terminal and axillary; rames 12–25 cm long. Pistillate spikelets 6–8 mm long, 3–5.5 mm wide, sessile, sunken, and embedded in the indurate rame, dorsally compressed; lemmas awnless.

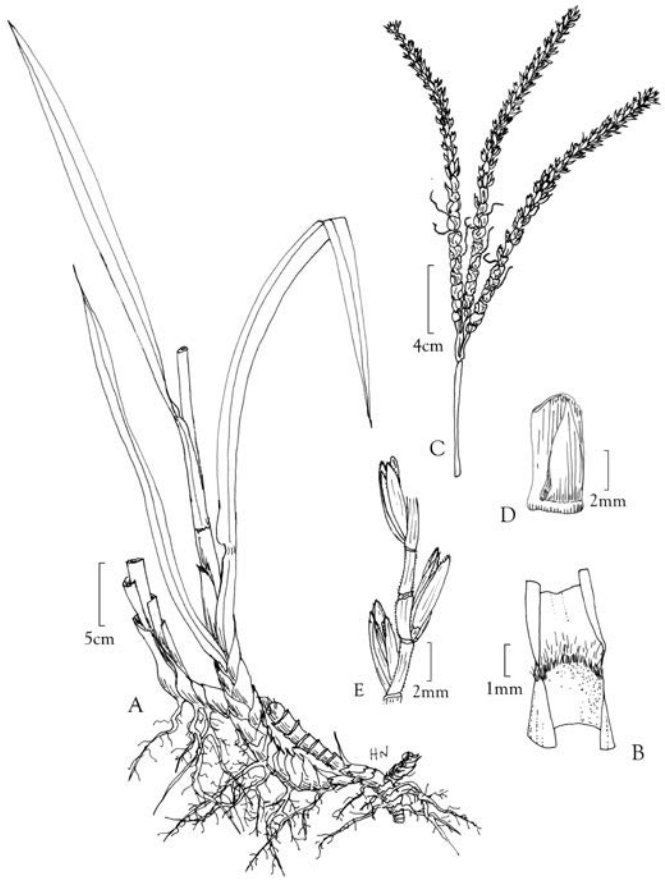

FIGURE 188. *Tripsacum dactyloides*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle with three branches. D. Pistillate spikelet. E. Staminate spikelets. A–C drawn from *Van Eseltine 424* (US-642955); D, E modified from Barkworth et al. (2003).

181. *Triticum aestivum** L.

FIGURE 189

Triticum aestivum* L., Sp. Pl. 1: 85. 1753.
Common name: wheat.

Caespitose annuals. Culms 14–150 cm tall; internodes thin walled. Leaves cauline; sheaths glabrous or pubescent, oral hairs ciliate, auricles falcate; ligules 1 mm long, eciliate membranes apex erose; blades 10–60 cm long, 0–15(–20) mm wide, linear, flat, pubescent, margins scabrous, apex acute. Spikes (3.5–)6–18 cm long, linear or oblong, bilateral. Spikelets 10–15 mm long, ascending, 1 per node, solitary, ovate, laterally compressed, packed broadside to rachis; principal lemma awns 4–150 mm long.

FIGURE 189. *Triticum aestivum*. A. Habit. B. Sheath, ligule, and blade. C. Spike. D. Spikelet. A, B drawn from *Smith s.n.* (US-1963579); C, D modified from Hitchcock (1951).

182. *Zizania aquatica* L.

FIGURE 190

Zizania aquatica L., Sp. Pl. 2: 991. 1753.
Common names: Indian wild rice, wild rice.

Solitary annuals or short-lived perennials; plants monoecious. Culms 90–300 cm tall, erect or decumbent at base, reed-like, spongy. Leaves basal and cauline; sheaths glabrous or pubescent; ligules 0.3–20 mm long, eciliate membranes, apex truncate to acute, entire or usually somewhat lacerate; blades to 1.5 m long, (3–)10–55(–75) mm wide, linear, flat, scaberulous, glabrous, margins scabrous, apex acute. Panicles 20–120 cm long, (5–)10–50 cm wide, open, ovate; branches unisexual. Pistillate spikelets 5–24 mm long, 1–2.5 mm wide, lanceolate, laterally compressed; staminate spikelets 5–12.5 mm long; principal lemma awns 10–20 mm long.

FIGURE 190. *Zizania aquatica*. A. Base of culm. B. Sheath, ligule, and blade. C. Panicle. D. Pistillate spikelet. A, B, D drawn from *Kanal 663* (US-3205460); C modified from Barkworth et al. (2007).

Glossary of Terms

adaxial. The side of an organ toward the axis, e.g., upper surface of a leaf. Opposite: abaxial.
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 where the base clasps 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 bristle-like 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.

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.
caudices. Short, thickened, verticillate or branched stems, usually subterranean or at ground level; in grasses, found at the base of the culm.
cauline. Borne on or arising along the stem, compared to basal, where leaves are mainly near the base.
chartaceous. Of papery or tissue-like 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 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, these 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, used to describe the panicles of *Miscanthus*.
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. With 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 *Pennisetum*.
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.
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, orange-like, 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 gland-like body, any protuberance of like nature which 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 the 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; see *Dichanthelium*.
hirsute. With straight, long, coarse, and stiff hairs.
hirtellous. Minutely hirsute.
hispid. Beset with stiff hairs, often strong enough to penetrate the skin.
hooded. Shaped like a hood or boat shaped, used to describe the leaf blade apex in most species of *Poa*.
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 palea-like 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 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 knob-like.
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 nipple-like projections.
pectinate. Comb-like, 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.
pleated. Folded; see plicate.
plicate. Folded into pleats lengthwise several times like a closed fan.
pit glands. Small glandular depressions common on some species of *Eragrostis*.
plane. Level, flat surface.
plicate. Folded on several ribs in the manner of a closed fan.
plumose. Covered with long, spreading, soft hairs, each hair with 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 *Eragrostis pectinacea*.
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, i.e., shaped like 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.

rib. A prominent vein, usually on a leaf.
ridged. Having raised veins.
rhizome. An underground stem, differing from a true root in the presence of buds or scalelike leaves.
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, 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, bristle-like.
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 that supports the branches of a spatheate inflorescence.
spatheate. With spathes or spatheoles.
spatheolate. Having spatheoles.
spatheole. A small leafy bract (spathe) enclosing part of an inflorescence.
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 spine-like.
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, 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, e.g., species, genus, tribe, subfamily, family, etc.
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 teeth-like 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.
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 glue-like.
viscous. Glutinous, or very sticky.
wanting. Lacking.
wart. A hard or firm excrescence.
webbed. A tuft of cotton-like hairs found just below the lemma in some species of *Poa*.
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.

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