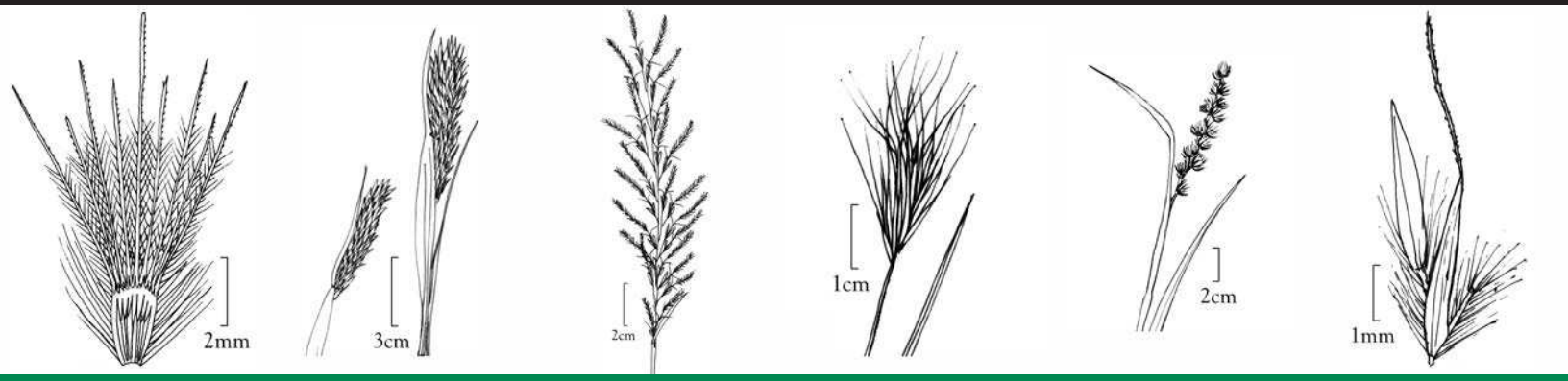
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Grasses of Egypt

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

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ABSTRACT

Ibrahim, Kamal M., Hasnaa A. Hosni, and Paul M. Peterson. Grasses of Egypt. *Smithsonian Contributions to Botany*, number 103, x + 201 pages, 292 figures, 1 table, 2016.—A vegetative key, descriptions, and illustrations for the identification of 284 native and naturalized grasses that occur in Egypt are presented. In addition, we provide a modern classification, glossary of terms, and indexes to scientific and common names. The key is based on vegetative characters to allow identification of specimens that do not have flowering structures (inflorescences and spikelets).

Cover images, from left to right: *Enneapogon persicus* spikelet (Figure 129C); *Phalaris paradoxa* habit (Figure 199A, detail); *Stipagrostis obtusa* habit (Figure 256A, detail); *Bromus fasciculatus* habit (Figure 42A, detail); *Cenchrus echinatus* habit (Figure 61A, detail); *Cymbopogon iwarancusa* spikelets (Figure 89D).

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Grasses of Egypt

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

INTRODUCTION

The grasses (asháb, عشاب) have played an important role in the daily life and economy of Egypt for more than 12,000 years (Boulos and Fahmy, 2007). The cultivation of cereals for making bread and the use of reed grasses for making baskets, mats, arrows, and building materials has been handed down through humans for centuries. Three hundred years before the Christian era, Theophrastus, a Greek scholar, used the term Πόα to include fodder grasses. The first scientific subdivision of the family was made by Brown (1814), who recognized two different spikelet types between Panicoideae and Pooideae (Festucoideae). Bentham (1881) recognized 13 tribes in two subfamilies. The two-subfamily classification was used by most agrostologists for almost 150 years until more modern syntheses. With the infusion of molecular data, the present concept and classification of the grasses is changing at a rapid rate. We follow the grass classification presented in Soreng et al. (2015a, 2015b) that consists of ±12,074 species in 771 genera found in 12 subfamilies, 51 tribes, and 80 subtribes. We provide a synopsis of the classification for all grass genera that occur in Egypt (Table 1).

Muschler (1912) discusses the history of botanical discovery, suggesting Ascherson and Schweinfurth's (1887) study of the indigenous vegetation was the foundation for future systematic work on botany of Egypt. Subsequent floristic treatments of the grasses of Egypt have been done by Täckholm and Täckholm (1941), Täckholm (1956, 1974), Ibrahim and Kabuye (1998), and Cope (2005). Cope and Hosni (1991) presented a comprehensive key to the grasses of Egypt, and the first key utilizing vegetative characters was completed by Hosni and Ibrahim (2004). The latter work pertained only to the grasses of the northwestern coastal region and lacked descriptions and illustrations of the species.

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

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TABLE 1. Synopsis of the classification of the genera into subfamily, tribe, and subtribe for the grasses of Egypt.

Subfamily Aristidoideae
- Tribe Aristideae: *Aristida*, *Stipagrostis*

Subfamily Arundinoideae
- Tribe Arundineae: *Arundo*
- Tribe Molinieae: *Phragmites*

Subfamily Chloridoideae
- Tribe Centropodieae: *Centropodia*
- Tribe Cynodonteae: *Dactyloctenium*, *Halopyrum*
  - Subtribe Aeluropodinae: *Aeluropus*
  - Subtribe Eleusininae: *Chloris*, *Coelachyrum*, *Cynodon*, *Dinebra*, *Diplachne*, *Eleusine*, *Schoenefeldia*, *Tetrapogon*
  - Subtribe Gymnopogoninae: *Leptothrium*
  - Subtribe Traginae: *Tragus*
  - Subtribe Trichoneurinae: *Trichoneura*
  - Subtribe Tripogoninae: *Desmostachya*, *Melanocenchris*
- Tribe Eragrostideae
  - Subtribe Cotteinae: *Enneapogon*, *Schmidtia*
  - Subtribe Eragrostidinae: *Eragrostis*
- Tribe Triraphideae: *Triraphis*
- Tribe Zoysieae
  - Subtribe Sporobolinae: *Sporobolus*

Subfamily Danthonioideae
- Tribe Danthonieae: *Cortaderia*, *Schismus*

Subfamily Oryzoideae
- Tribe Ehrharteae: *Ehrharta*
- Tribe Oryzeae
  - Subtribe Oryzinae: *Leersia*, *Oryza*

Subfamily Panicoideae
- Tribe Andropogoneae: *Chrysopogon*, *Imperata*, *Pogonatherum*
  - Subtribe Andropogoninae: *Andropogon*, *Hyparrhenia*
  - Subtribe Anthistiriinae: *Cymbopogon*, *Dichanthium*, *Themeda*
  - Subtribe Coicinae: *Coix*
  - Subtribe Rottboelliinae: *Elionurus*, *Hemarthria*, *Lasiurus*, *Vossia*
  - Subtribe Saccharinae: *Miscanthus*, *Saccharum*
  - Subtribe Sorghinae: *Sorghum*
  - Subtribe Tripsacinae: *Zea*
- Tribe Paniceae
  - Subtribe Anthephorinae: *Digitaria*
  - Subtribe Boivinellinae: *Echinochloa*
  - Subtribe Cenchrinae: *Cenchrus*, *Setaria*, *Stenotaphrum*
  - Subtribe Melinidinae: *Melinis*, *Megathyrsus*, *Moorochloa*, *Tricholaena*, *Urochloa*
  - Subtribe Panicinae: *Panicum*
- Tribe Paspaleae
  - Subtribe Paspalinae: *Paspalum*
- Tribe Tristachyideae: *Danthoniopsis*

Subfamily Pooideae
- Tribe Brachypodieae: *Brachypodium*
- Tribe Bromeae: *Bromus*
- Tribe Lygeeae: *Lygeum*
- Tribe Meliceae: *Melica*
- Tribe *Poeae*
  - Subtribe Agrostidinae: *Agrostis*, *Ammophila*, *Gastridium*, *Polypogon*, *Triplachne*
  - Subtribe Ammochloinae: *Ammochloa*
  - Subtribe Airinae: *Corynephorus*
  - Subtribe Aveninae: *Avena*, *Lagurus*, *Rostraria*, *Trisetaria*
  - Subtribe Brizinae: *Briza*
  - Subtribe Cynosurinae: *Cynosurus*
  - Subtribe Dactylidinae: *Dactylis*, *Lamarckia*
  - Subtribe Holcinae: *Holcus*
  - Subtribe Loliinae: *Lolium*
  - Subtribe Parapholiinae: *Catapodium*, *Cutandia*, *Desmazeria*, *Parapholis*, *Sphenopus*
  - Subtribe Phalaridinae: *Phalaris*
  - Subtribe Poinae: *Alopecurus*, *Festuca*, *Phleum*, *Poa*
- Tribe Stipeae: *Oloptum*, *Piptatherum*, *Stipa*, *Stipellula*
- Tribe Triticeae
  - Subtribe Hordeinae: *Agropyron*, *Crithopsis*, *Elymus*, *Eremopyrum*, *Hordeum*, *Taeniatherum*
  - Subtribe Triticinae: *Aegilops*, *Triticum*

it is important to use characters that are less mutable and subject to environmental influences.

Any given species may have one or more common names. Two or more grass species may have the same common name, and some species have no common name. Most of the local common names reported in this publication are of Arabic origin used in Egypt, whereas common names used in other countries of North Africa and the Middle East are not included. A common name can often help collectors and field officers tentatively identify a grass, particularly when local people have used a common name to describe a grass. We include the common names used in Täckholm (1974), Cope (2005), and files at the Cairo University Herbarium (CAI).

This publication presents a key, descriptions, illustrations, and glossary for the identification of 284 native and naturalized grasses that occur in Egypt. The list of species is primarily based on Cope's (2005) treatment of the Gramineae of Egypt. We have consulted many taxonomic treatments during the preparation of this work, most notable are: Bor (1968), Boulous (1995, 2005), Chaudhary (1989), Clayton et al. (2006), Cope (1982, 2005, 2007), Forman and Perrson (1974), Häfliger and Scholz (1980, 1981), Ibrahim and Peterson (2014), Liu et al. (2014), Peterson et al. (2003; 2010, 2011, 2012, 2014a; 2014b; 2014c;2014d; 2015), Phillips (1995), Romaschenko et al. (2012), Saarela et al. (2014), Sherif and Siddiqi (1988), Täckholm (1956, 1974), and Wickens (1977).

We follow the accepted names in the Catalogue of New World Grasses (Soreng et al., 2015a) and a worldwide generic classification based principally on molecular DNA sequence studies (Soreng et al., 2015b). Vegetative characteristics are used to construct the key for identification. Diagrammatic illustrations are presented for each species to emphasize the structural characteristics. Descriptions of species are 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 (Figure 1). 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 contain the flower parts (pistil and stamens). The general morphology of a grass is shown in detail in Figures 1–8.

Roots. The luxuriant fibrous root system anchors the growing grass plant and is composed 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. Stolons are trailing or reclining, aboveground stems that produce roots and flowering shoots from their nodes.

Culms. The grass stem is known as a culm (Figure 1) and consists of a series of internodes and nodes. The internodes at the base of a culm are very short, 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* 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 only at basal nodes 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 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).

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.

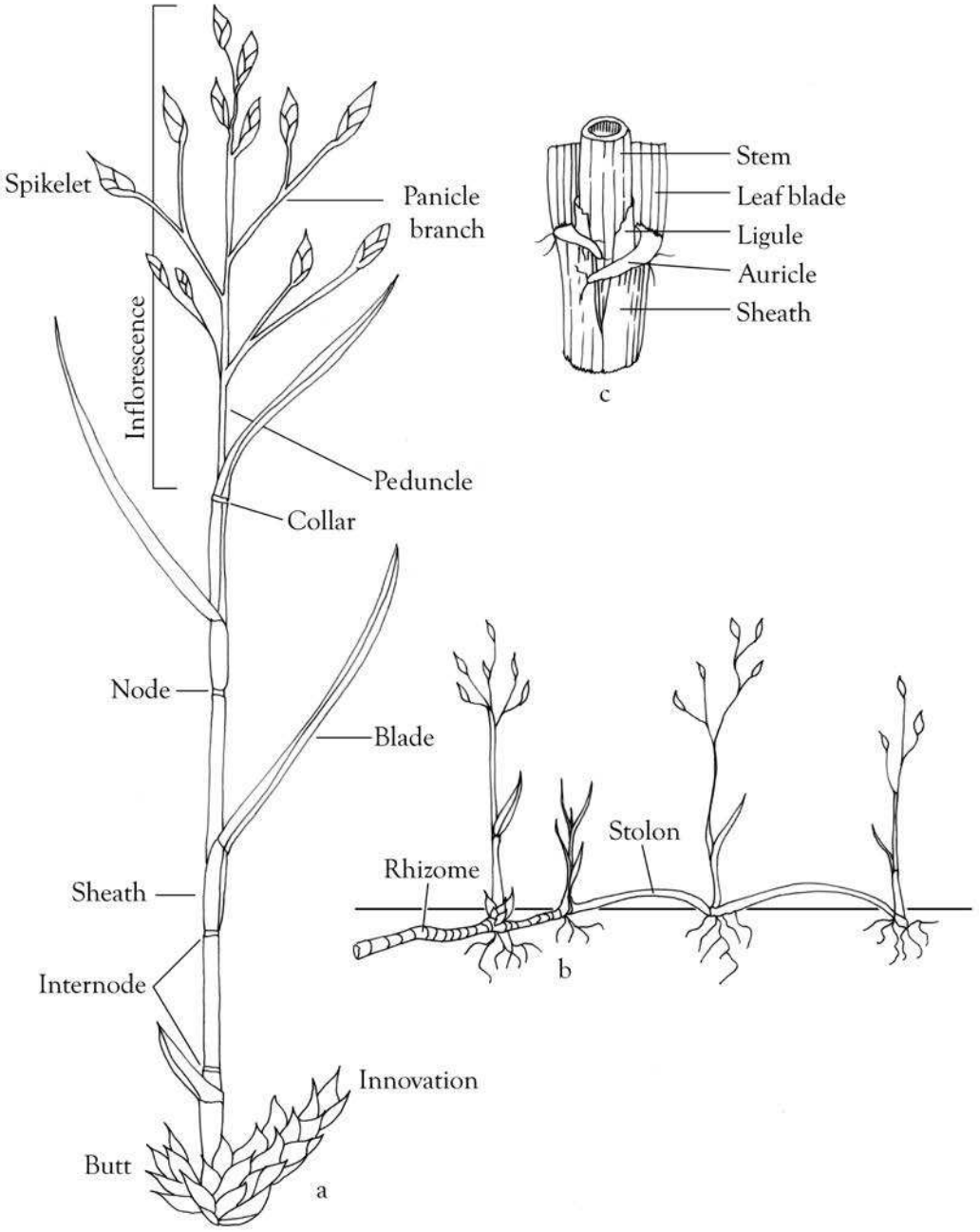


FIGURE 1. General morphology. a. Culm. b. Rhizome and stolon. c. Sheath, ligule, and blade.

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.

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



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

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

Inflorescences. Different inflorescence types are distinguished by the presence or absence of pedicels and the branching of the main axis. Aside from the basic forms of

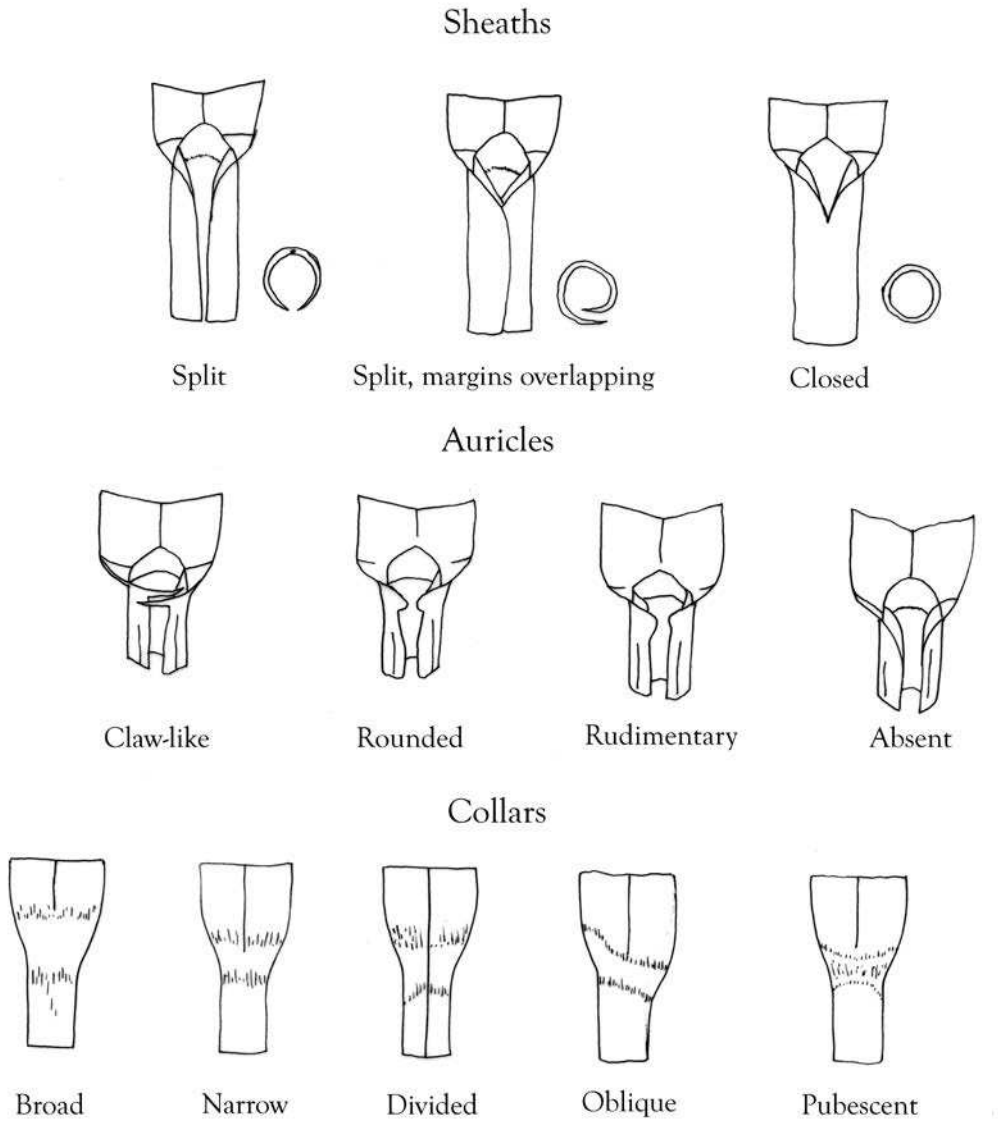


FIGURE 3. Types of sheaths, auricles, and collars.

a spike, raceme, and panicle, there are many subtypes (Figures 7, 8).

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

RACEMES. A raceme is an unbranched inflorescence with each spikelet borne on a single pedicels directly on the axis. This type of inflorescence is rare in the grasses, but there are many species for which 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, with each branch terminating in a pedicellate spikelet. A true panicle does not have any leaf sheaths within the inflorescence. A rame is a compound inflorescence in the tribe Andropogoneae consisting of one to many units (branches) of one sessile and one or two pedicellate spikelets. This arrangement is typical of the Andropogoneae and in many of the older published floras was referred to as "racemes."

PHYTOGEOGRAPHY

Phytogeographical territories for Egypt were first delineated by Hassib (1950), and later, El Hadidi (1980) introduced some minor changes to the eight phytogeographic (ecologic) territories, two of which had subdivisions. Our phytogeographic map

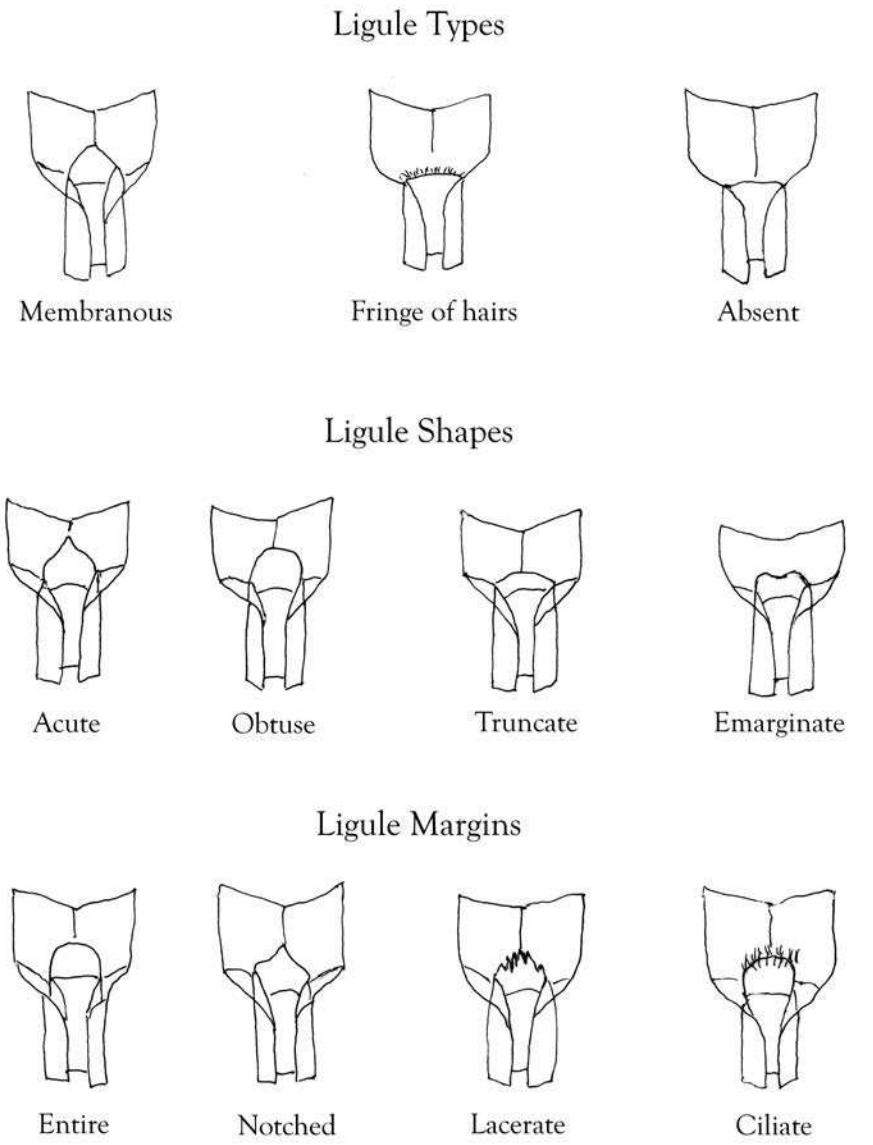


FIGURE 4. Ligule types, shapes, and margins.

of Egypt (Figure 9) includes these same eight territories, and these are divided into 17 total regions following El Hadidi and Hosni (2000) and El Hadidi (2000a; 2000b). We include each grass species distribution in these territories and subdivisions in Egypt (in parentheses) and then indicate their general distribution in surrounding countries or areas.

Identification

Descriptions. The grass descriptions were recorded from plant specimens at the U.S. National Herbarium (US), Department of Botany, National Museum of Natural History, Smithsonian Institution and CAI, Cairo University, Cairo, Egypt, and a few specimens on loan from Kew and the British Museum. Information from these specimens was verified with the descriptions of species reported in the references. Each description (arranged alphabetically) includes the complete scientific name with authorities and place of publication and common name(s), if known (Arabic italicized, followed by English). 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 several references. Care should be taken

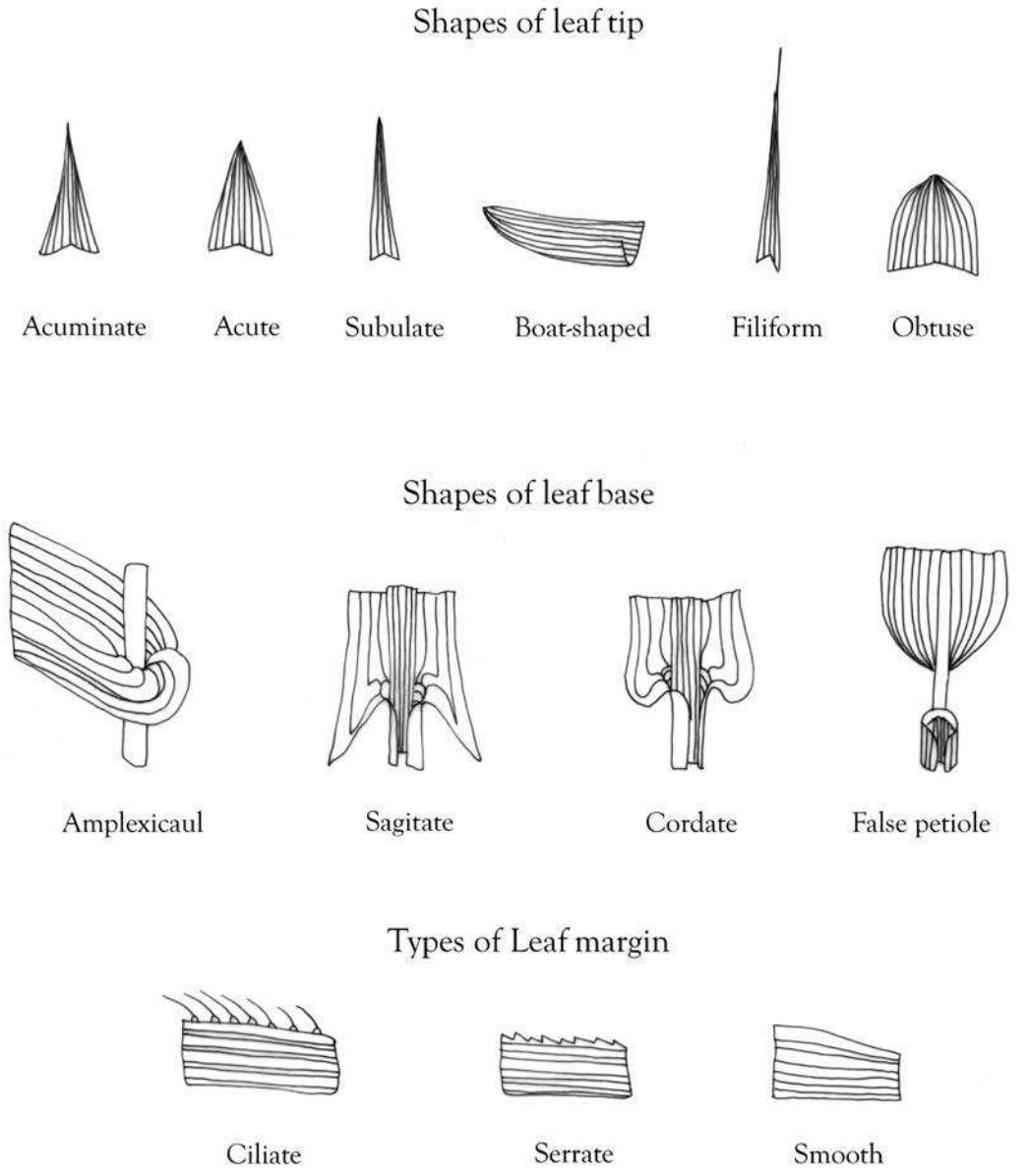


FIGURE 5. Leaf blade apices, bases, and margins.

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 composed of a blade and a sheath surrounding the culm and open down the side, in most cases to the base. Commonly, the top of the sheath has a membranous projection (ligule) pressed against the culm. Sometimes the ligule is represented by a fringe of hairs or a shallow rim. In other cases it is absent. In contrast to grasses, the majority of sedges have solid stems that are mostly triangular in cross section. The base of the leaf usually forms a closed sheath around the stem, and there is no ligule. However, sometimes there is a projection at the top of the sheath, opposite the leaf blade, instead of between the blade and the culm as with grass species. Rushes have solid stems and are usually round in cross section, and the nodes are indistinct. The leaves of rushes are usually three-ranked and usually

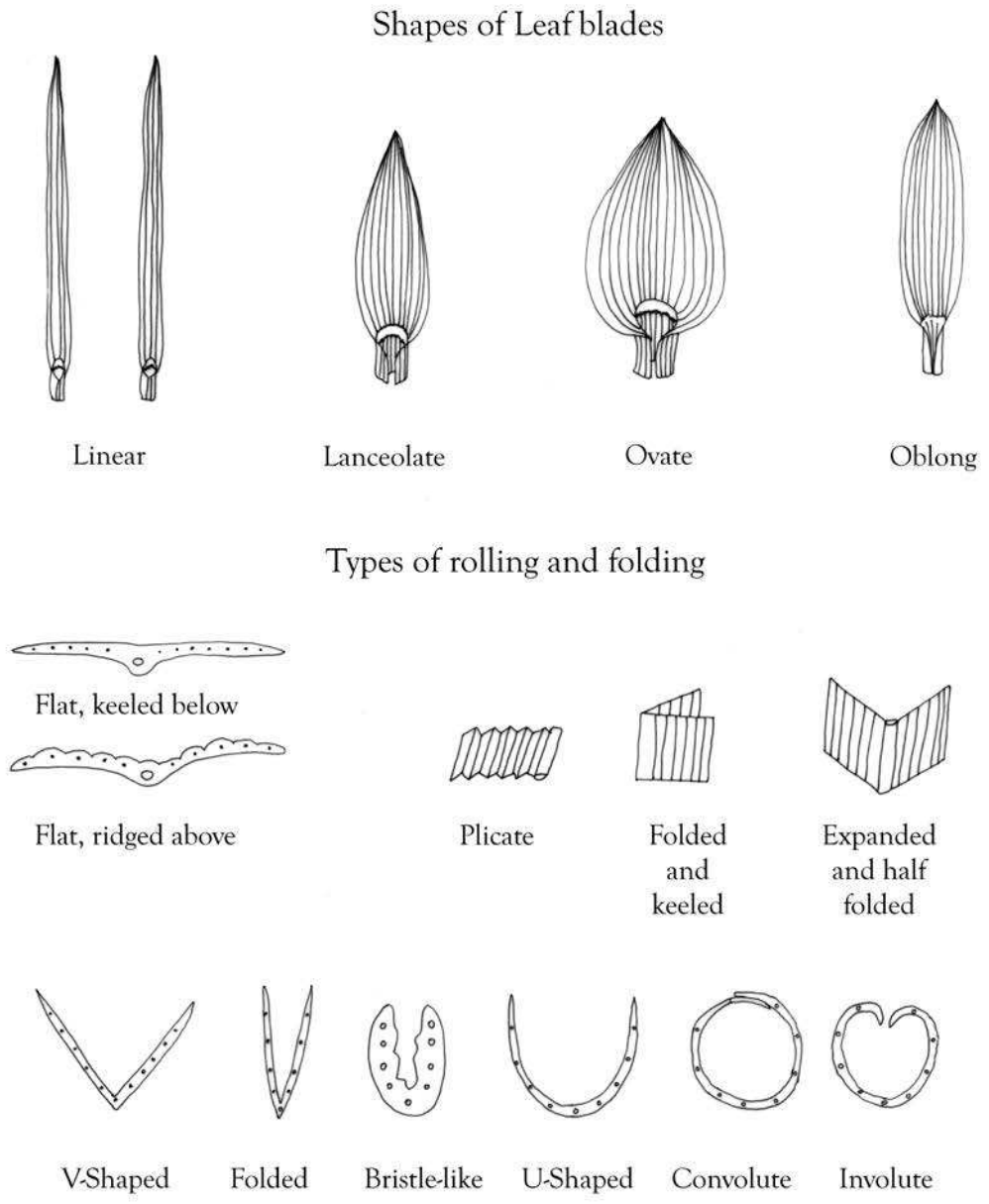


FIGURE 6. Leaf blade characteristics.

not stiff; ligules are absent or weakly developed, and auricles are absent.

KEYS. Since we are dealing with 284 grasses in Egypt, the keys have been constructed to make use of easily visible characteristics. The only additional aids necessary are a short metric scale, graduated in millimeters, and a hand lens with a magnification of 10–14×. The identification key is composed of two parts: a key to major groups and then a key to each group. Although many readers are familiar with the use of a dichotomous key, a note on use 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 entry in the 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 the end of an entry. Turn to the text for a description and illustration of the species, which are arranged alphabetically. In using the key you may

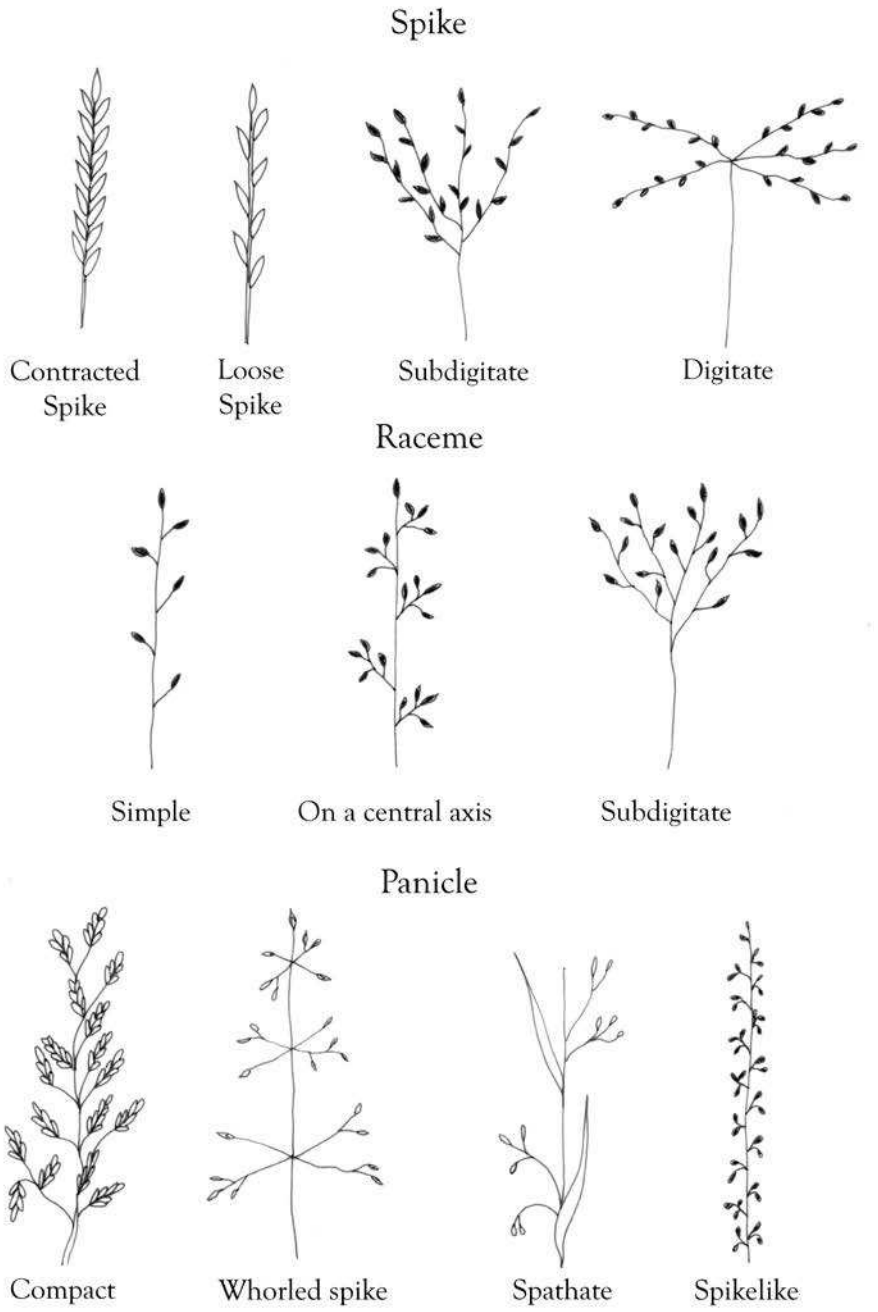


FIGURE 7. Inflorescence types.

need to refer to the glossary, which immediately follows the descriptions (Quattrocchi, 2006).

Acknowledgments

We thank the U.S. National Herbarium (US), Department of Botany, National Museum of Natural History, Smithsonian Institution for allowing the first author work space; the staff of Cairo University Herbarium (CAI) in Giza; Robert J. Soreng (US) for providing valuable information from the Catalogue of New World Grasses (Poaceae); Deborah Bell (US) for assistance; John G. Fitzsimons, University of Guelph, Guelph, Ontario, Canada, for his valuable advice and financial contributions; and Naiim Moselhy, director of the Desert Research

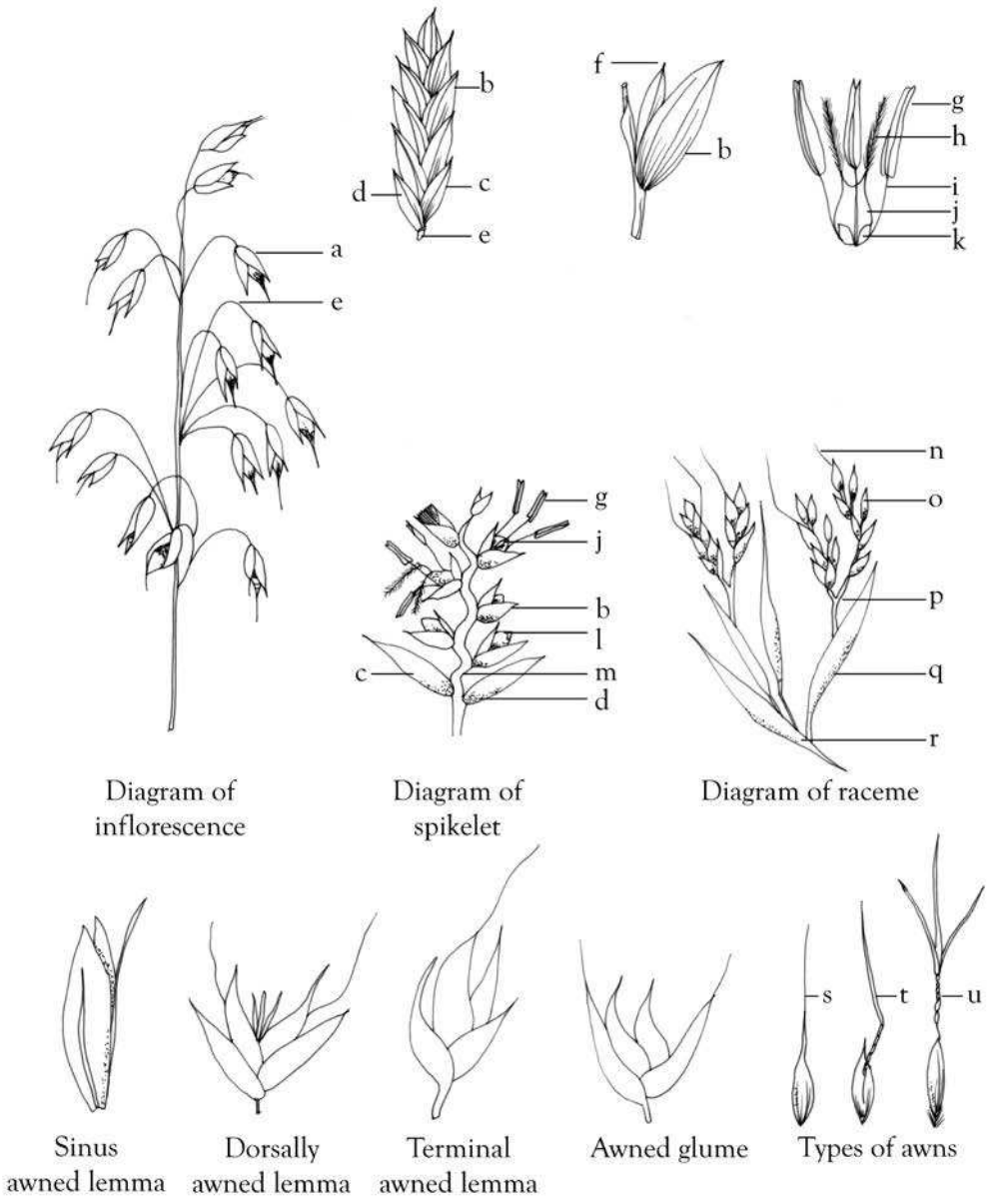


FIGURE 8. Inflorescence and spikelet characteristics. Labels indicate the following: a, spikelet; b, lemma; c, upper glume; d, lower glume; e, pedicel; f, palea; g, anther; h, stigma; i, filament; j, ovary; k, lodicule; l, grain; m, rachilla; n, awn; o, raceme; p, peduncle; q, spatheole; r, spathe; s,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

Center. In addition, we thank Kitt Repass for preparing the illustrations and revising a few initial drawings made by Heidi Nevin, Dhan Bhandari, and Magdalena Sudnik. We give special thanks to Karen Dillon and Alice Tangerini for help with Photoshop, to Kate Nicolette for typing the text, and to Adel El-Gazzar and Monier M. Abd El-Ghani for many helpful comments aimed at improving the manuscript.

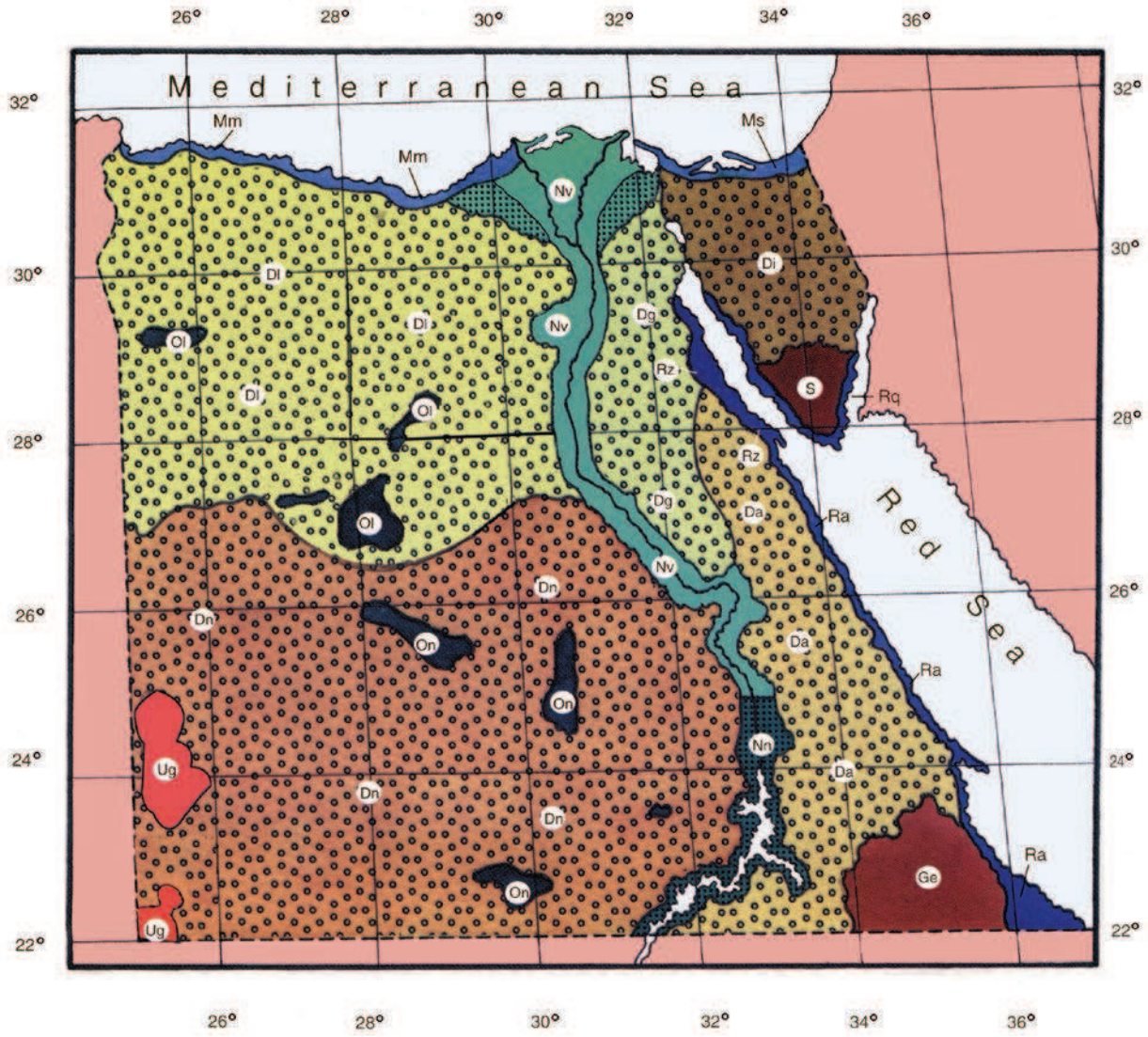


FIGURE 9. Phytogeographical territories of Egypt. Da: Arabian Desert, the southern province of the desert east of the Nile; Dg: Galala Desert, the northern province of the desert east of the Nile; Di: Isthmic Desert, the northern part of Sinai Peninsula, south of the Mediterranean coastal land and its extension westward to the Nile Delta; Dl: Libyan Desert, the northern province of the desert west of the Nile; Dn: Nubian Desert, the southern province of the desert west of the Nile; Ge: Gebel Elba district, at the southeast corner of the Arabian Desert; Mm: Mareotis sector of the Mediterranean coastal land extending along the Egypt–Libyan border, eastward to Rosetta; Ms: Sinaitic sector of the Mediterranean coastal land extending between Port Said eastward to Rafah at the Egyptian–Palestinian border; Nn: Nubian sector of Nile land, extending from Sudanese border northward to Kom Ombo; Nv: Nile Valley sector of Nile land, extending from Kom Ombo northward to include the Nile-fed Faiyum area and the Nile Delta with its extensions of reclaimed lands of Tahrir Province to the west and Salhiya district to the east; Ol: Oases of the Libyan Desert province; On: Oases of the Nubian Desert province; Ra: Arabian sector of the Red Sea coastal plains extending between 22°N and 28°N; Rq: Gulf of Aqaba sector of the Red Sea coastal plains, which extends along the western coast of the Gulf of Aqaba between 28°N and 29°30°N; Rz: Gulf of Suez sector of the Red Sea coastal plains in the Eastern Desert and Sinai between 28°N and 30°N; S: mountainous southern Sinai; Ug: Gebel `Uweinat massive on Egypt's border with Libya and Sudan and the northerly situated El Gilf El Kebir plateau.

Vegetative Key to the Grasses of Egypt

1a. Culms bamboo-like or reeds . . . . . Group 1
1b. Culms not bamboo-like or reeds 2
2a. Plants mat forming . . . . . Group 2
2b. Plants not mat forming 3
3a. Rhizomes knotty . . . . . Group 3
3b. Rhizomes not knotty 4
4a. Internodes solid . . . . . Group 4
4b. Internodes not solid 5
5a. Lower nodes rooting . . . . . Group 5
5b. Lower nodes not rooting 6
6a. Butt sheaths forming a bulb-like base . . . . . Group 6
6b. Butt sheaths not forming a bulb-like base 7
7a. Stolons present Group7
7b. Stolons not present 8
8a. Leaf apices pungent . . . . . Group 8
8b. Leaf apices not pungent 9
9a. Internodes hirsute, hispid, pubescent, or sparsely hairy 9A
9b. Internodes not hirsute, hispid, pubescent, or sparsely hairy 10
10a. Culm internodes scabrous . . . . . Group 10
10b. Culm internodes not scabrous 11
11a. Leaf blade surfaces ribbed or pleated . . . . . Group 11
11b. Leaf blade surfaces not ribbed or pleated 12
12a. Rhizomes present . . . . . Group 12
12b. Rhizomes absent 13
13a. Leaf sheaths longer than the blades . . . . . Group 13
13b. Leaf sheaths not longer than the blades 14
14a. Ligules ciliate or ciliolate membranes . . . . . Group 14
14b. Ligules not ciliate or ciliolate membranes 15
15a. Leaf blades filiform . . . . . Group 15
15b. Leaf blades not filiform 16
16a. Ligules 6–10 mm long . . . . . Group 16
16b. Ligules not 6–10 mm long 17
17a. Auricles present . . . . . Group 17
17b. Auricles absent 18
18a. Leaf sheaths keeled or flattened Group18
18b. Leaf sheaths not keeled or flattened 19

19a. Ligules a fringe of hairs Group19
19b. Ligules not a fringe of hairs 20
20a. Leaf blade apices attenuate . . . . . Group 20
20b. Leaf blade apices not attenuate 21
21a. Nodes bearded . . . . . Group 21
21b. Nodes not bearded 22
22a. Leaf blade margins glabrous, smooth . . . . . Group 22
22b. Leaf blade margins not glabrous or smooth 23
23a. Ligules absent or less than 3 mm long . . . . . Group 23
23b. Ligules 3–6 mm long . . . . . Group 24

GROUP 1. CULMS BAMBOO OR REEDLIKE

1a. Internodes solid . . . . . (210) ***Saccharum officinarum***
1b. Internodes not solid 2
2a. Auricles clawlike . . . . . (107) ***Echinochloa pyramidalis***
2b. Auricles not clawlike 3
3a. Ligules 10–30 mm long . . . . . (14) ***Ammophila arenaria***
3b. Ligules not 10–30 mm long 4
4a. Leaves distichous . . . . . (19) ***Arundo donax***
4b. Leaves not distichous 5
5a. Collars dark, leaf blade surfaces scabrous . . . . . (194) ***Phragmites mauritianus***
5b. Collars not dark, leaf blade surfaces glabrous . . . . . (193) ***Phragmites australis***

GROUP 2. MAT FORMING

1a. Butt sheaths forming a bulb . . . . . (91) ***Dactyloctenium scindicum***
1b. Butt sheaths not forming a bulb 2
2a. Leaf blade surfaces viscid . . . . . (167) ***Melinis minutiflora***
2b. Leaf blade surfaces not viscid 3
3a. Auricles clawlike . . . . . (84) ***Cynodon dactylon***
3b. Auricles not clawlike 4
4a. Collars dark . . . . . (183) ***Paspalum distichum***
4b. Collars not dark 5
5a. Ligules erose-dentate . . . . . (101) ***Digitaria violascens***
5b. Ligules not erose-dentate 6
6a. Culms spongy . . . . . (283) ***Vossia cuspidata***
6b. Culm not spongy 7
7a. Leaf blades lanceolate . . . . . (238) ***Stenotaphrum secundatum***
7b. Leaf blade not lanceolate 8
8a. Leaf blade margins glandular . . . . . (53) ***Cenchrus longisetus***
8b. Leaf blade margins not glandular 9
9a. Leaf blade surfaces hairy . . . . . (85) ***Cynodon transvaalensis***
9b. Leaf blade surfaces not hairy 10
10a. Ligules ciliolate membrane . . . . . (89) ***Dactyloctenium aegyptium***
10b. Ligules not ciliolate membrane 11
11a. Leaf blades needlelike . . . . . (216) ***Setaria geminata***
11b. Leaf blades not needlelike 12
12a. Nodes dark colored . . . . . (236) ***Sporobolus spicatus***
12b. Nodes not dark colored 13
13a. Leaves distichous . . . . . (234) ***Sporobolus pungens***
13b. Leaves not distichous 14
14a. Leaf blade apices acute . . . . . (201) ***Pogonatherum paniceum***
14b. Leaf blade apices not acute 15

15a. Rhizomes short, less than 3 mm long . . . . . (131) ***Eragrostis sarmentosa***
15b. Rhizomes much longer 16
16a. Stolons present . . . . . (51) ***Cenchrus clandestinus***
16b. Stolons absent . . . . . (219) ***Setaria obtusifolia***

GROUP 3. RHIZOME KNOTTY

1a. Culms woody, internodes glabrous . . . . . (56) ***Cenchrus ramosissimus***
1b. Culms not woody, internodes hairy 2
2a. Leaf blades deciduous at the ligules, surfaces ribbed . . . . . (62) ***Centropodia fragilis***
2b. Leaf blades deciduous at the ligules, surfaces not ribbed . . . . . (92) ***Danthoniopsis barbata***

ALTERNATIVE KEY TO GROUP 3

1a. Leaf surfaces glandular . . . . . (62) ***Centropodia fragilis***
1b. Leaf surfaces not glandular 2
2a. Leaf blades lanceolate . . . . . (92) ***Danthoniopsis barbata***
2b. Leaf blades not lanceolate . . . . . (56) ***Cenchrus ramosissimus***

GROUP 4. INTERNODES SOLID

1a. Culms woody . . . . . (178) ***Panicum turgidum***
1b. Culms not woody 2
2a. Leaf sheaths strongly compressed . . . . . (61) ***Centropodia forskalii***
2b. Leaf sheaths not compressed 3
3a. Rhizomes elongated, ligules ciliate membranes . . . . . (211) ***Saccharum spontaneum***
3b. Rhizomes absent, ligules eciliate membranes 4
4a. Leaf sheaths longer than adjacent internodes 5
4b. Leaf sheaths shorter than adjacent internodes 6
5a. Culms branched, leaf blades linear lanceolate . . . . . (284) ***Zea mays* subsp. *mexicana***
5b. Culms not branched, leaf blades linear . . . . . (284) ***Zea mays***
6a. Culm nodes dark colored . . . . . (274) ***Triticum durum***
6b. Culm nodes not dark colored 7

GROUP 5. ROOTING AT THE LOWER NODES

1a. Culms with bulb-like bases . . . . . (98) ***Digitaria nodosa***
1b. Culms without bulb-like bases 2
2a. Culm internodes scabrous . . . . . (184) ***Paspalum racemosum***
2b. Culm internodes not scabrous 3
3a. Culm internodes sparsely hairy . . . . . (50) ***Cenchrus ciliaris***
3b. Culm internodes glabrous or pubescent 5
4a. Leaf blade apices obtuse . . . . . (66) ***Chloris pycnothrix***
4b. Leaf blade apices simple 5
5a. Ligule truncate . . . . . (182) ***Paspalum dilatatum***
5b. Ligule not truncate 6
6a. Leaf blade margins tuberculate . . . . . (280) ***Urochloa panicoides***
6b. Leaf blades margins not tuberculate 7
7a. Ligules erose . . . . . (99) ***Digitaria sanguinalis***
7b. Ligules not erose 8
8a. Culms spongy 9
8b. Culms not spongy 10
9a. Culm nodes glabrous, dark colored . . . . . (108) ***Echinochloa stagnina***
9b. Culm nodes bearded, not dark colored . . . . . (175) ***Panicum hygrocharis***

10a. Leaf blade margins cartilaginous 11
10b. Leaf blade margins not cartilaginous 12
11a. Leaf blade surfaces hairy both sides . . . . . (279) ***Urochloa mutica***
11b. Leaf blade surfaces glabrous . . . . . (282) ***Urochloa reptans***
12a. Leaf sheath surfaces scabrous . . . . . (164) ***Megathyrsus maximus***
12b. Leaf sheath surfaces not scabrous 13
13a. Leaf sheath surfaces and margins sparsely hairy . . . . . (168) ***Melinis repens***
13b. Leaf sheath surfaces and margins not sparsely hairy 14
14a. Culm internodes pubescent 15
14b. Culm internodes glabrous 16
15a. Auricles clawlike . . . . . (156) ***Leersia hexandra***
15b. Auricles absent . . . . . (225) ***Sorghum halepense***
16a. Ligules a fringe of hairs . . . . . (60) ***Cenchrus violaceus***
16b. Ligules not a fringe of hair 17
17a. Auricles clawlike 18
17b. Auricles absent 19
18a. Leaf apices attenuate, plants aquatic . . . . . (104) ***Diplachne fusca***
18b. Leaf apices acuminate, plant not aquatic . . . . . (11) ***Agrostis stolonifera***
19a. Ligules eciliate membranes . . . . . (204) ***Polypogon viridis***
19b. Ligules ciliate membranes 20
20a. Leaf blades filiform . . . . . (1) ***Acrachne racemosa***
20b. Leaf blades not filiform 21
21a. Leaf blades lanceolate . . . . . (145) ***Hemarthria altissima***
21b. Leaf blades linear 22
22a. Leaf blade margins glabrous 23
22b. Leaf blade margins not glabrous 24
23a. Stolons present, oral hairs lacking . . . . . (64) ***Chloris gayana***
23b. Stolons absent, oral hairs ciliate . . . . . (67) ***Chloris virgata***
24a. Leaf blades apices attenuate . . . . . (223) ***Sorghum arundinaceum***
24b. Leaf blade linear, apices acute 25
25a. Culms sparsely branched, blade bases rounded . . . . . (89) ***Dactyloctenium aegyptium***
25b. Culms unbranched, blade bases simple 26
26a. Leaf sheath surfaces glabrous . . . . . (110) ***Eleusine africana***
26b. Leaf sheath surfaces hairy . . . . . (90) ***Dactyloctenium aristatum***

GROUP 6. BUTT SHEATHS FORMING BULBS

1a. Culm nodes bearded . . . . . (118) ***Enneapogon desvauxii***
1b. Culm nodes not bearded 2
2a. Leaf blade bases broadly rounded . . . . . (174) ***Panicum coloratum***
2b. Leaf blade bases simple 3
3a. Ligules ciliate membranes; rhizomes elongated . . . . . (177) ***Panicum repens***
3b. Ligules not ciliate membranes; rhizome absent or short 4
4a. Ligules a fringe of hairs 5
4b. Ligules eciliate membranes 6
5a. Leaf blades viscid, pubescent both sides . . . . . (214) ***Schmidtia pappophoroides***
5b. Leaf blades not viscid, surfaces sparsely hairy . . . . . (58) ***Cenchrus setiger***
6a. Oral hairs ciliate, leaf sheath margins hairy . . . . . (98) ***Digitaria nodosa***
6b. Oral hairs lacking, leaf sheath margins not hairy 7
7a. Leaf blade apices abruptly acute, ligules acute . . . . . (200) ***Poa sinaica***
7b. Leaf blade apices acute, ligules erose, dentate 8
8a. Culm internodes striate; leaf sheath margins hyaline . . . . . (188) ***Phalaris coerulescens***
8b. Culm internodes smooth; leaf sheath margins membranous . . . . . (185) ***Phalaris aquatica***

GROUP 7. STOLONS PRESENT

1a. Leaf blades lanceolate, butt sheaths woolly . . . (8) ***Aeluropus lagopoides***
1b. Leaf blades not lanceolate, butt sheath not woolly . . . 2
2a. Leaf blades filiform . . . 3
2b. Leaf blades not filiform . . . 4
3a. Culm internodes densely pubescent, blades straight . . . (241) ***Stipagrostis acutiflora***
3b. Culm internodes glabrous, blades curly . . . (144) ***Halopyrum mucronatum***
4a. Ligules a fringe of hairs . . . (231) ***Sporobolus ioclados***
4b. Ligules ciliate or ciliolate membranes . . . 5
5a. Rhizomes present . . . 6
5b. Rhizomes absent . . . 7
6a. Butt sheaths pubescent, oral hairs ciliate . . . (177) ***Panicum repens***
6b. Butt sheath glabrous, oral hairs lacking . . . (9) ***Aeluropus littoralis***
7a. Culms spongy . . . (175) ***Panicum hygrocharis***
7b. Culms not spongy . . . 8
8a. Culm internodes striate, leaf blade margins smooth . . . (64) ***Chloris gayana***
8b. Culm internodes not striate, leaf blade margins scabrous . . . (63) ***Chloris flagellifera***

GROUP 8. LEAF BLADE APICES PUNGENT

1a. Butt sheaths woolly . . . (249) ***Stipagrostis plumosa***
1b. Butt sheaths not woolly . . . 2
2a. Internodes hirsute . . . (243) ***Stipagrostis drarii***
2b. Internodes not hirsute . . . 3
3a. Nodes bearded . . . (83) ***Cymbopogon schoenanthus***
3b. Nodes not bearded . . . 4
4a. Leaf sheaths compressed or keeled . . . 5
4b. Leaf sheaths not compressed or keeled . . . 6
5a. Culms woody, internodes smooth; oral hairs ciliate . . . (254) ***Stipagrostis vulnerans***
5b. Culms not woody, internodes striate; oral hairs lacking . . . (251) ***Stipagrostis scoparia***
6a. Leaf sheaths much longer than leaf blade . . . (120) ***Enneapogon persicus***
6b. Leaf sheaths not much longer than leaf blade . . . 7
7a. Auricles clawlike . . . (10) ***Agropyron cristatum***
7b. Auricles not clawlike . . . 8
8a. Rhizomes absent . . . (248) ***Stipagrostis paradisea***
8b. Rhizomes present . . . 9
9a. Culm internodes smooth, later branches ample, ligules acute . . . (82) ***Cymbopogon nardus***
9b. Culm internodes striate, not branched, ligules lacerate . . . (116) ***Elymus farctus***

GROUP 9. CULM INTERNODES HAIRY

1a. Internodes hirsute, villous, or hispid ... Subgroup A
1b. Internodes pubescent or sparsely hairy . . . Subgroup B

SUBGROUP 9A. INTERNODES HIRSUTE, VILLOUS, OR HISPID

1a. Rootstocks evident, culms woody . . . (173) ***Panicum antidotale***
1b. Rootstocks lacking, culms not woody . . . 2
2a. Ligules ciliate membranes . . . (176) ***Panicum miliaceum***
2b. Ligules not ciliate membranes . . . 3
3a. Culm nodes bearded . . . (95) ***Dichanthium annulatum***
3b. Culm nodes not bearded . . . 4

4a. Rhizomes elongated . . . . . (250) ***Stipagrostis raddiana***
4b. Rhizomes absent 5
5a. Leaf blade curled or flexuous . . . . . (245) ***Stipagrostis lanata***
5b. Leaf blade straight 6
6a. Leaf blade apices attenuate, filiform 7
6b. Leaf blade apices not attenuate, filiform 8
7a. Leaf sheaths ribbed, blade surfaces scabrous . . . . . (246) ***Stipagrostis multinerva***
7b. Leaf sheaths not ribbed, blade surface pubescent . . . . . (252) ***Stipagrostis shawii***
8a. Leaf sheaths tubular most of their length . . . . . (31) ***Bromus danthoniae***
8b. Leaf sheaths open 9
9a. Ligules erose serrate . . . . . (33) ***Bromus fasciculatus***
9b. Ligules lacerate 10
10a. Midrib conspicuous, leaf blade margins scabrous . . . . . (271) ***Trisetaria macrochaeta***
10b. Midrib not conspicuous, leaf blade margins ciliate . . . . . (269) ***Trisetaria koelerioides***

SUBGROUP 9B. INTERNODES PUBESCENT OR SPARSELY HAIRY

1a. Internodes sparsely hairy 2
1b. Internodes not sparsely hairy 3
2a. Rhizomes short and scaly, culm nodes bearded . . . . . (50) ***Cenchrus ciliaris***
2b. Rhizomes absent, culm nodes not bearded . . . . . (113) ***Eleusine indica***
3a. Ligules 6–8 mm long . . . . . (239) ***Stipa arabica***
3b. Ligules less than 6 mm 4
4a. Rhizomes present 5
4b. Rhizomes absent 6
5a. Rhizomes scaly, elongated, usually more than 2 cm long . . . . . (225) ***Sorghum halepense***
5b. Rhizomes scaly, short 7
6a. Oral hairs ciliate; leaf sheath surfaces sparsely hairy . . . . . (38) ***Bromus lepidus***
6b. Oral hairs lacking; leaf sheath surface glabrous . . . . . (35) ***Bromus inermis***
7a. Culms wiry from woody rootstock . . . . . (264) ***Tricholaena teneriffae***
7b. Culms not wiry 8
8a. Leaf blade apices obtuse 9
8b. Leaf blade apices not obtuse 10
9a. Ligules eciliate membranes . . . . . (208) ***Rostraria pumila***
9b. Ligules a fringe of hairs . . . . . (247) ***Stipagrostis obtusa***
10a. Leaf blades apices attenuate . . . . . (278) ***Urochloa leersioides***
10b. Leaf blade apices acute or acuminate 11
11a. Ligules ciliate membranes . . . . . (153) ***Lagurus ovatus***
11b. Ligules not ciliate membranes 12
12a. Ligules a fringe of hairs 13
12b. Ligules eciliate membranes 14
13a. Leaf sheath surface glabrous . . . . . (49) ***Cenchrus biflorus***
13b. Leaf sheath surface hairy . . . . . (59) ***Cenchrus sieberianus***
14a. Ligules truncate . . . . . (255) ***Stipellula capensis***
14b. Ligules lacerate . . . . . (40) ***Bromus pectinatus***

GROUP 10. CULM INTERNODES SCABROUS

1a. Ligules a fringe of hairs . . . . . (72) ***Cortaderia selloana***
1b. Ligules not a fringe of hairs 2
2a. Leaf sheaths much longer than leaf blades . . . . . (270) ***Trisetaria linearis***
2b. Leaf sheaths not much longer than leaf blades 3
3a. Leaf sheaths tubular much of their lengths . . . . . (42) ***Bromus pumilio***
3b. Leaf sheaths not tubular . . . . . (184) ***Paspalum racemosum***

ALTERNATIVE KEY TO GROUP 10

1a. Ligules a fringe of hairs . . . . . (72) ***Cortaderia selloana***
1b. Ligules not a fringe of hairs 2
2a. Leaf sheaths much longer than leaf blades . . . . . (270) ***Trisetaria linearis***
2b. Leaf sheaths not much longer than leaf blades 3
3a. Leaf sheaths tubular much of their lengths . . . . . (42) ***Bromus pumilio***
3b. Leaf sheaths not tubular . . . . . (184) ***Paspalum racemosum***

GROUP 11. LEAF BLADE SURFACE RIBBED OR PLEATED

1a. Auricles clawlike . . . . . (115) ***Elymus elongatus***
1b. Auricles absent 2
2a. Ligules a fringe of hairs . . . . . (218) ***Setaria megaphylla***
2b. Ligules not a fringe of hairs 3
3a. Ligules 3–6 mm long . . . . . (195) ***Piptatherum holciforme***
3b. Ligules less than 3 mm long 4
4a. Leaf sheaths flattened 5
4b. Leaf sheaths not flattened 6
5a. Leaf blades appressed, apices acute/acuminate . . . . . (179) ***Parapholis filiformis***
5b. Leaf blades not appressed, apices attenuate . . . . . (181) ***Parapholis marginata***
6a. Leaf blade apices filiform . . . . . (171) ***Oloptum miliaceum***
6b. Leaf blade apices acute or acuminate 7
7a. Culms wiry, weak, ligules obtuse . . . . . (140) ***Festuca fasciculata***
7b. Culms not wiry, tough, ligules lacerate . . . . . (199) ***Poa persica***

ALTERNATIVE KEY TO GROUP 11

1a. Rhizome elongated . . . . . (171) ***Oloptum miliaceum***
1b. Rhizome not elongated 2
2a. Auricle clawlike . . . . . (115) ***Elymus elongatus***
2b. Auricle not clawlike 3
3a. Ligule obtuse . . . . . (140) ***Festuca fasciculata***
3b. Ligule not obtuse 4
4a. Ligules a fringe of hairs . . . . . (218) ***Setaria megaphylla***
4b. Ligule not a fringe of hairs 5
5a. Leaf sheath closed . . . . . (199) ***Poa persica***
5b. Leaf sheath not closed 6
6a. Leaf sheath margin entire . . . . . (181) ***Parapholis marginata***
6b. Leaf sheath margin not entire 7
7a. Leaf apex acute . . . . . (179) ***Parapholis filiformis***
7b. Leaf apex not acute . . . . . (195) ***Piptatherum holciforme***

GROUP 12. RHIZOMES PRESENT

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

SUBGROUP 12A. RHIZOMES SHORT

1a. Ligules more than 6 mm long . . . . . (163) ***Lygeum spartum***
1b. Ligules less than 6 mm long 3
2a. Culms wiry, leaf blade margins cartilaginous . . . . . (151) ***Hyparrhenia hirta***
2b. Culms not wiry, leaf blade margins not cartilaginous 4

3a. Leaf sheaths flattened . . . . . (155) ***Lasiurus scindicus***
3b. Leaf sheaths not flattened 5
4a. Leaf sheath surfaces scabrous . . . . . (164) ***Megathyrsus maximus***
4b. Leaf sheath surfaces not scabrous 6
5a. Ligules fringed hairs 7
5b. Ligules ciliate or eciliate membranes 8
6a. Culms tall, roots aromatic, leaf blade apices acuminate . . . . . (69) ***Chrysopogon zizanioides***
6b. Culms woody, tough, roots not aromatic, leaf blade apices attenuate . . . . . (54) ***Cenchrus orientalis***
7a. Ligules ciliate membranes . . . . . (169) ***Miscanthus sinensis***
7b. Ligules eciliate membranes 9
8a. Culm nodes bearded 10
8b. Culm nodes glabrous 11
9a. Ligules more than 3 mm long . . . . . (79) ***Cymbopogon flexuosus***
9b. Ligules less than 3 mm long . . . . . (78) ***Cymbopogon citratus***
10a. Culms with ample branches, ligules truncate . . . . . (112) ***Eleusine floccifolia***
10b. Culms unbranched, ligules not truncate 12
11a. Leaf blade surfaces glabrous, apices abruptly acute . . . . . (93) ***Desmazeria philistaea***
11b. Leaf blade surface scabrous, apices acute . . . . . (185) ***Phalaris aquatica***

SUBGROUP 12B. RHIZOMES ELONGATED

1a. Auricles clawlike . . . . . (117) ***Elymus repens***
1b. Auricles absent 2
2a. Culm internodes striate, leaf sheath margins membranous . . . . . (109) ***Ehrharta calycina***
2b. Culm internodes not striate, leaf sheath margins not membranous 3
3a. Ligules a fringe of hairs . . . . . (94) ***Desmostachya bipinnata***
3b. Ligule not a fringe of hairs 4
4a. Ligules ciliate membranes . . . . . (177) ***Panicum repens***
4b. Ligules eciliate membranes 5
5a. Culm nodes bearded, blade carriage appressed . . . . . (152) ***Imperata cylindrica***
5b. Culm nodes not bearded 6
6a. Leaf sheaths tubular for most of their length, ligules 6–10 mm long . . . . . (166) ***Melica persica***
6b. Leaf sheaths not tubular, ligules 1–3 mm long . . . . . (186) ***Phalaris arundinacea***

GROUP 13. LEAF SHEATHS LONGER THAN BLADES

1a. Leaf blade apices pungent . . . . . (120) ***Enneapogon persicus***
1b. Leaf blade not pungent 2
2a. Leaf apices attenuate 3
2b. Leaf apices not attenuate 4
3a. Lower nodes rooting . . . . . (67) ***Chloris virgata***
3b. Lower nodes not rooting . . . . . (157) ***Leptothrium senegalense***
4a. Plants mat forming 5
4b. Plants not mat forming 6
5a. Culms branched, ligules a fringe of hairs . . . . . (233) ***Sporobolus niliacus***
5b. Culms unbranched, ligules eciliate membrane . . . . . (75) ***Cutandia dichotoma***
6a. Culm internodes with ridges . . . . . (70) ***Coelachyrum brevifolium***
6b. Culm internodes without ridges 7
7a. Culm internodes semiterete . . . . . (170) ***Moorochloa eruciformis***
7b. Culm internodes terete 8
8a. Ligule apices acute . . . . . (228) ***Sphenopus divaricatus***
8b. Ligule apices not acute 9
9a. Culm nodes bearded 10
9b. Culm nodes not bearded 11
10a. Oral hair ciliate; leaf blades conduplicate . . . . . (114) ***Elionurus royleanus***

10b. Oral hairs lacking; leaf blades not conduplicate 12
11a. Leaf blade linear, flat, spreading . . . . . (96) ***Dichanthium foveolatum***
11b. Leaf blade filiform, ascending . . . . . (242) ***Stipagrostis ciliata***
12a. Culms branched 13
12b. Culms unbranched 15
13a. Auricles present . . . . . (5) ***Aegilops longissima***
13b. Auricles absent 14
14a. Ligules a fringe of hairs . . . . . (229) ***Sporobolus aculeatus***
14b. Ligules eciliate membrane . . . . . (77) ***Cutandia memphitica***
15a. Auricles present 16
15b. Auricles absent 17
16a. Oral hairs ciliate; leaf sheath surfaces sparsely hairy . . . . . (4) ***Aegilops kotschyi***
16b. Oral hairs lacking; leaf sheath surfaces glabrous . . . . . (6) ***Aegilops peregrina***
17a. Ligules ciliate membrane . . . . . (122) ***Eragrostis aegyptiaca***
17b. Ligules eciliate membranes or a fringe of hairs 18
18a. Ligules eciliate membrane . . . . . (39) ***Bromus madritensis***
18b. Ligules a fringe of hairs 19
19a. Leaf blades linear . . . . . (119) ***Enneapogon lophotrichus***
19b. Leaf blades lanceolate 20
20a. Leaf blade bases simple . . . . . (281) ***Urochloa ramosa***
20b. Leaf blade bases broadly rounded 21
21a. Leaf sheath margins sparsely hairy . . . . . (262) ***Tragus berteronianus***
21b. Leaf blade margins membranous . . . . . (263) ***Tragus racemosus***

ALTERNATIVE KEY TO GROUP 13

1a. Ligules obtuse . . . . . (77) ***Cutandia memphitica***
1b. Ligules not obtuse 2
2a. Ligules acute . . . . . (228) ***Sphenopus divaricatus***
2b. Ligules not acute 3
3a. Leaf blades hairy on basal third . . . . . (114) ***Elionurus royleanus***
3b. Leaf blades not hairy on basal third 4
4a. Ligules ciliolate membrane 5
4b. Ligules not ciliolate membrane 6
5a. Leaf sheaths keeled, culms wiry . . . . . (67) ***Chloris virgata***
5b. Leaf sheaths not keeled, culms not wiry . . . . . (96) ***Dichanthium foveolatum***
6a. Leaf blade apices attenuate . . . . . (157) ***Leptothrium senegalense***
6b. Leaf blade apices not attenuate 7
7a. Ligules dentate . . . . . (70) ***Coelachyrum brevifolium***
7b. Ligules not dentate 8
8a. Leaf sheath margins sparsely hairy . . . . . (262) ***Tragus berteronianus***
8b. Leaf sheath margins not sparsely hairy 9
9a. Leaf blade margins sparsely hairy . . . . . (233) ***Sporobolus niliacus***
9b. Leaf blade margins not sparsely hairy 10
10a. Culm nodes dark colored . . . . . (122) ***Eragrostis aegyptiaca***
10b. Culm nodes not dark colored 11
11a. Collars dark colored . . . . . (75) ***Cutandia dichotoma***
11b. Collar not dark colored 12
12a. Leaf blades conduplicate, rootstocks evident . . . . . (4) ***Aegilops kotschyi***
12b. Leaf blades not conduplicate, rootstocks not evident 13
13a. Ligules lacerate, blades glaucous . . . . . (39) ***Bromus madritensis***
13b. Ligules not lacerate, ligules not glaucous 14
14a. Culms prostrate . . . . . (229) ***Sporobolus aculeatus***
14b. Culms not prostrate 15
15a. Leaf sheath margins membranous 16

15b. Leaf sheath margins not membranous 17
16a. Ligules a fringe of hairs, blades lanceolate . . . . . (263) ***Tragus racemosus***
16b. Ligules eciliate membranes, blades linear . . . . . (70) ***Coelachyrum brevifolium***
17a. Leaf blade surfaces hairy on both sides . . . . . (6) ***Aegilops peregrina***
17b. Leaf blade surfaces not hairy on both sides 18
18a. Auricles clawlike . . . . . (5) ***Aegilops longissima***
18b. Auricles not clawlike 19
19a. Leaf sheath surfaces hairy . . . . . (170) ***Moorochloa eruciformis***
19b. Leaf sheath surfaces not hairy 20
20a. Culm nodes bearded, leaf blade margins glabrous . . . . . (242) ***Stipagrostis ciliata***
20b. Culm nodes not bearded, leaf blade margins not glabrous 21
21a. Leaf blade apices pungent . . . . . (120) ***Enneapogon persicus***
21b. Leaf blade apices not pungent 22
22a. Leaf blades lanceolate . . . . . (281) ***Urochloa ramosa***
22b. Leaf blades not lanceolate . . . . . (119) ***Enneapogon lophotrichus***

GROUP 14. LIGULES CILIATE OR CILIOLATE MEMBRANES

1a. Leaf blade apices obtuse . . . . . Subgroup A
1b. Leaf blade apices not obtuse 2
2a. Leaf blade apices attenuate, filiform, or abruptly acute . . . . . Subgroup B
2b. Leaf blade apices acute or acuminate . . . . . Subgroup C

SUBGROUP 14A. LEAF BLADE APICES OBTUSE

1a. Leaf sheaths keeled . . . . . (66) ***Chloris pycnothrix***
1b. Leaf sheaths not keeled 2
2a. Culm nodes dark colored . . . . . (258) ***Tetrapogon cenchriformis***
2b. Culm nodes not dark colored . . . . . (259) ***Tetrapogon villosus***

SUBGROUP 14B. LEAF BLADE APICES ATTENUATE, FILIFORM, OR ABRUPTLY ACUTE

1a. Culms spongy . . . . . (175) ***Panicum hygrocharis***
1b. Culms not spongy 2
2a. Culms woody . . . . . (240) ***Stipa lagascae***
2b. Culms not woody 3
3a. Culm internodes striate . . . . . (215) ***Schoenefeldia gracilis***
3b. Culm internodes not striate 4
4a. Culm sheaths keeled . . . . . (1) ***Acrachne racemosa***
4b. Culm sheaths not keeled 5
5a. Culm nodes dark colored . . . . . (127) ***Eragrostis japonica***
5b. Culm nodes not dark colored 6
6a. Leaf blade lanceolate . . . . . (135) ***Eragrostis tremula***
6b. Leaf blade linear or filiform 7
7a. Oral hairs ciliate . . . . . (213) ***Schismus barbatus***
7b. Oral hairs lacking 8
8a. Leaf blade bases cordate . . . . . (80) ***Cymbopogon iwarancusa***
8b. Leaf blade bases simple . . . . . (223) ***Sorghum arundinaceum***

SUBGROUP 14C. LEAF BLADE APICES ACUTE OR ACUMINATE

1a. Leaf blade surfaces conspicuously plicate . . . . . (16) ***Aristida adscensionis***
1b. Leaf blade surfaces not plicate 2
2a. Leaf blade margins glandular . . . . . (125) ***Eragrostis cilianensis***

2b. Leaf blade margins eglandular . . . 3
3a. Auricles present, clawlike . . . (266) ***Triplachne nitens***
3b. Auricles absent . . . 4
4a. Culms branched . . . 5
4b. Culms unbranched . . . 6
5a. Leaf blade lanceolate, culms bulb-like base . . . (124) ***Eragrostis barrelieri***
5b. Leaf blade linear, culms not bulb-like base . . . (174) ***Panicum coloratum***
6a. Leaf blades filiform . . . 7
6b. Leaf blades linear . . . 8
7a. Leaf blades ascending, revolute . . . (109) ***Ehrharta calycina***
7b. Leaf blades spreading, conduplicate . . . (259) ***Tetrapogon villosus***
8a. Culm nodes bearded . . . (260) ***Themeda triandra***
8b. Culm nodes not bearded . . . 9
9a. Leaf blades curled or flexuous . . . (268) ***Trisetaria glumacea***
9b. Leaf blades straight or flaccid . . . 10
10a. Leaf blade bases amplexicaul . . . (261) ***Themeda villosa***
10b. Leaf blade bases not amplexicaul . . . 11
11a. Leaf blade bases cordate or broadly rounded . . . 12
11b. Leaf blade bases not cordate or broadly rounded . . . 13
12a. Oral hairs ciliate; leaf blade surfaces glabrous . . . (224) ***Sorghum bicolor***
12b. Oral hairs lacking; leaf blade surfaces scabrous . . . (227) ***Sorghum × drummondii***
13a. Plants solitary . . . (130) ***Eragrostis pilosa***
13b. Plants caespitose . . . 14
14a. Culm internodes with ridges . . . 15
14b. Culm internodes smooth . . . 17
15a. Leaf sheaths keeled, blades conduplicate . . . (134) ***Eragrostis tenuifolia***
15b. Leaf sheaths not keeled, blades not conduplicate . . . 16
16a. Oral hairs ciliate; leaf blades hairy on basal third . . . (129) ***Eragrostis minor***
16b. Oral hairs lacking; leaf blades sparsely hairy . . . (221) ***Setaria verticillata***
17a. Culms decumbent . . . (133) ***Eragrostis tenella***
17b. Culms erector geniculately ascending . . . 18
18a. Leaf blade surfaces scabrous, midrib conspicuous above . . . 19
18b. Leaf blade surfaces not scabrous, midrib not conspicuous above . . . 20
19a. Leaf sheath surfaces glabrous, blades conduplicate . . . (110) ***Eleusine africana***
19b. Leaf sheath surfaces hairy, blades not conduplicate . . . (127) ***Eragrostis japonica***
20a. Culm internodes elliptical in section . . . (111) ***Eleusine coracana***
20b. Culm internodes not elliptical in section . . . 21
21a. Leaf sheaths flattened . . . (126) ***Eragrostis ciliaris***
21b. Leaf sheaths not flattened . . . 22
22a. Leaf blade margins scabrous . . . 23
22b. Leaf blade margins cartilaginous . . . 24
23a. Leaf sheath glabrous . . . (65) ***Chloris prieurii***
23b. Leaf sheath hairy on upper ⅓ . . . (132) ***Eragrostis tef***
24a. Culm internodes semi-terete, nodes not dark . . . (123) ***Eragrostis aspera***
24b. Culm internodes terete, nodes dark color . . . (128) ***Eragrostis lepida***

GROUP 15. LEAF BLADES FILIFORM

1a. Culm internodes striate . . . (244) ***Stipagrostis hirtigluma***
1b. Culm internodes not striate . . . 2
2a. Auricles clawlike . . . (142) ***Festuca pectinella***
2b. Auricles absent . . . 3
3a. Leaf blade margins hairy . . . (165) ***Melanocenchris abyssinica***
3b. Leaf blade margins glabrous . . . 4

4a. Culms wiry, leaf blade surfaces hairy . . . . . (141) ***Festuca myuros***
4b. Culms not wiry, leaf blade surfaces scabrous or glabrous 5
5a. Leaf blade surfaces glabrous . . . . . (76) ***Cutandia maritima***
5b. Leaf blade surfaces scabrous 6
6a. Ligules a fringe of hairs 7
6b. Ligules eciliate membranes 8
7a. Culm nodes bearded, leaf blade bases truncate . . . . . (212) ***Schismus arabicus***
7b. Culm nodes not bearded, leaf blade bases simple . . . . . (253) ***Stipagrostis uniplumis***
8a. Oral hairs present . . . . . (47) ***Catapodium rigidum***
8b. Oral hairs lacking 9
9a. Leaf sheaths keeled or flattened . . . . . (73) ***Corynephorus divaricatus***
9b. Leaf sheaths not keeled or flattened . . . . . (83) ***Cymbopogon schoenanthus***

GROUP 16. LIGULES 6–10 MM LONG

1a. Auricles clawlike . . . . . (172) ***Oryza sativa***
1b. Auricles absent 2
2a. Ligules decurrent . . . . . (88) ***Dactylis glomerata***
2b. Ligules not decurrent 3
3a. Leaf blade bases tapering to the midrib, leaf blades curled or flexuous . . . . . (21) ***Avena fatua***
3b. Leaf blade bases simple, blades straight 4
4a. Leaf blade margins tuberculate, collars dark colored . . . . . (189) ***Phalaris minor***
4b. Leaf blade margins scabrous or glabrous, collars not dark colored 5
5a. Culms branching ample . . . . . (203) ***Polypogon monspeliensis***
5b. Culms not branched 6
6a. Leaf blade apices obtuse . . . . . (86) ***Cynosurus coloratus***
6b. Leaf blade apices not obtuse 7
7a. Ligules truncate . . . . . (24) ***Avena sterilis***
7b. Ligules not truncate 8
8a. Leaf sheath margins membranous 9
8b. Leaf sheath margins not membranous 10
9a. Leaf blade margins glabrous . . . . . (154) ***Lamarckia aurea***
9b. Leaf blade margins scabrous . . . . . (87) ***Cynosurus echinatus***
10a. Plants solitary, leaves ascending . . . . . (143) ***Gastridium phleoides***
10b. Plants caespitose, leaves spreading 11
11a. Oral hairs ciliate; ligules acute . . . . . (190) ***Phalaris paradoxa***
11b. Oral hairs lacking; ligules erose . . . . . (187) ***Phalaris canariensis***

GROUP 17. AURICLES PRESENT

1a. Auricles obtuse . . . . . (13) ***Ammochloa palaestina***
1b. Auricles falcate or clawlike 2
2a. Leaf blade apices attenuate or pungent 3
2b. Leaf blade apices not attenuate or pungent 4
3a. Leaf blade margins cartilaginous . . . . . (10) ***Agropyron cristatum***
3b. Leaf blade margins entire . . . . . (158) ***Lolium arundinaceum***
4a. Leaf blade surfaces hairy on both sides . . . . . (7) ***Aegilops ventricosa***
4b. Leaf blade surfaces not hairy on both sides 5
5a. Oral hairs ciliate 6
5b. Oral hairs lacking 7
6a. Leaf sheath surfaces hairy . . . . . (3) ***Aegilops geniculata***
6b. Leaf sheath surfaces not hairy . . . . . (276) ***Triticum turgidum***
7a. Leaf sheath margins scabrous . . . . . (257) ***Taeniatherum caput-medusae***
7b. Leaf sheath margins not scabrous 8
8a. Culm internodes semiterete . . . . . (136) ***Eremopyrum bonaepartis***

8b. Culm internodes terete 9
9a. Culms wiry . . . . . (2) ***Aegilops bicornis***
9b. Culms not wiry 10
10a. Ligules acute . . . . . (162) ***Lolium temulentum***
10b. Ligules not acute 11
11a. Leaf sheath margins sparsely hairy . . . . . (147) ***Hordeum marinum***
11b. Leaf sheath margins not sparsely hairy 12
12a. Leaf sheath margins hairy . . . . . (273) ***Triticum dicoccum***
12b. Leaf sheath margins not hairy 13
13a. Leaf sheath surfaces scabrous . . . . . (159) ***Lolium multiflorum***
13b. Leaf sheath surfaces not glabrous 14
14a. Culm nodes bearded . . . . . (272) ***Triticum aestivum***
14b. Culm nodes not bearded 15
15a. Ligules decurrent . . . . . (137) ***Eremopyrum distans***
15b. Ligules not decurrent 16
16a. Leaf sheath sparsely hairy . . . . . (150) ***Hordeum vulgare***
16b. Leaf sheath not sparsely hairy 17
17a. Leaf sheath margins membranous 18
17b. Leaf sheath margins not membranous 20
18a. Internodes smooth . . . . . (275) ***Triticum pyramidale***
18b. Internodes striate 19
19a. Leaf blade margins scabrous . . . . . (161) ***Lolium rigidum***
19b. Leaf blade margins glabrous . . . . . (274) ***Triticum durum***
20a. Culm nodes dark colored . . . . . (149) ***Hordeum spontaneum***
20b. Culm nodes not dark colored 21
21a. Leaf blade bases simple . . . . . (74) ***Crithopsis delileana***
21b. Leaf blade bases truncate 22
22a. Leaf blade surfaces scabrous, culms sparsely branched . . . . . (148) ***Hordeum murinum***
22b. Leaf blade surfaces sparsely hairy, culms unbranched . . . . . (160) ***Lolium perenne***

GROUP 18. LEAF SHEATHS FLATTENED, COMPRESSED, OR KEELED

1a. Ligules absent . . . . . (105) ***Echinochloa colona***
1b. Ligules present 2
2a. Leaf sheaths, the uppermost flattened 3
2b. Leaf sheaths all flattened or keeled 4
3a. Leaf sheath margins membranous . . . . . (12) ***Alopecurus myosuroides***
3b. Leaf sheath margins not membranous . . . . . (180) ***Parapholis incurva***
4a. Lower nodes rooting . . . . . (60) ***Cenchrus violaceus***
4b. Lower nodes not rooting 5
5a. Leaf blade surfaces glandular 6
5b. Leaf blade surfaces not glandular 7
6a. Leaf blades linear . . . . . (138) ***Festuca brevis***
6b. Leaf blades lanceolate . . . . . (235) ***Sporobolus schoenoides***
7a. Leaf blade apices abruptly acute 8
7b. Leaf blade apices not abruptly acute 9
8a. Leaf blade surfaces glabrous, culm bulb-like bases . . . . . (196) ***Poa annua***
8b. Leaf blade surfaces not bulb-like bases . . . . . (198) ***Poa infirma***
9a. Culm internodes pubescent . . . . . (49) ***Cenchrus biflorus***
9b. Culm internodes not pubescent 10
10a. Leaf blades lanceolate . . . . . (71) ***Coix lacryma-jobi***
10b. Leaf blades linear 11
11a. Ligules 3–6 mm long 12
11b. Ligules less than 3 mm long 13
12a. Plant solitary, nodes glabrous, leaf sheath glabrous . . . . . (76) ***Cutandia maritima***

12b. Plant caespitose, nodes pubescent, leaf sheath hairy . . . . . (146) ***Holcus annuus***
13a. Leaf blade margins glabrous . . . . . (261) ***Themeda villosa***
13b. Leaf blade margins scabrous or cartilaginous 14
14a. Culms branched 15
14b. Culms unbranched 17
15a. Leaf sheath margins hairy . . . . . (52) ***Cenchrus echinatus***
15b. Leaf sheath margins glabrous 16
16a. Leaf blades straight; perennials, aromatic . . . . . (68) ***Chrysopogon plumulosus***
16b. Leaf blades flaccid; annuals, not aromatic . . . . . (230) ***Sporobolus alopecuroides***
17a. Culm nodes bearded 18
17b. Culm nodes not bearded 19
18a. Leaf blade apices attenuate . . . . . (267) ***Triraphis pumilio***
18b. Leaf blade apices acute . . . . . (231) ***Sporobolus ioclados***
19a. Plants solitary; leaf blade apices attenuate . . . . . (217) ***Setaria italica***
19b. Plants caespitose; leaf blade apices acute 20
20a. Ligule an eciliate membrane . . . . . (207) ***Rostraria obtusiflora***
20b. Ligules ciliate 21
21a. Leaf blades reflexed; plants perennial . . . . . (134) ***Eragrostis tenuifolia***
21b. Leaf blades ascending, spreading; plants annual . . . . . (126) ***Eragrostis ciliaris***

GROUP 19. LIGULE A FRINGE OF HAIRS

1a. Leaf blade apices attenuate or filiform . . . . . (232) ***Sporobolus natalensis***
1b. Leaf blade apices not attenuate or filiform 2
2a. Culms wiry 3
2b. Culms not wiry 4
3a. Leaf blade margins glabrous; roots not aromatic . . . . . (17) ***Aristida funiculata***
3b. Leaf blade margins scabrous; roots aromatic . . . . . (68) ***Chrysopogon plumulosus***
4a. Leaf blade bases amplexicaul . . . . . (280) ***Urochloa panicoides***
4b. Leaf blade bases not amplexicaul 5
5a. Culms woody, leaf sheath surfaces hairy on basal ⅓ . . . . . (48) ***Cenchrus americanus***
5b. Culms not woody, leaf sheath surfaces not hairy on basal ⅓ 6
6a. Leaf blade surfaces hairy and viscid . . . . . (167) ***Melinis minutiflora***
6b. Leaf blade surfaces not hairy or viscid 7
7a. Leaf blade surfaces hairy both sides . . . . . (277) ***Urochloa deflexa***
7b. Leaf blade surfaces not hairy 8
8a. Oral hairs present 9
8b. Oral hairs lacking 10
9a. Leaf blades revolute, spreading; plant annuals . . . . . (57) ***Cenchrus setaceus***
9b. Leaf blades convolute, appressed; plants perennials . . . . . (18) ***Aristida mutabilis***
10a. Leaf blade margins glabrous; sheath margins closed . . . . . (15) ***Andropogon distachyos***
10b. Leaf blade margins not glabrous; sheath margins open 11
11a. Culms semiterete; leaf blades convolute . . . . . (121) ***Enneapogon scaber***
11b. Culms terete; leaf blades flat 12
12a. Leaf sheaths pubescent, oral hairs present . . . . . (57) ***Cenchrus pennisetiformis***
12b. Leaf sheaths glabrous, oral hairs lacking 13
13a. Culm nodes and collars dark; leaf blades loosely twisted . . . . . (220) ***Setaria pumila***
13b. Culm nodes and collars not dark; leaf blades straight 14
14a. Leaf sheath margins glabrous; blades ascending . . . . . (237) ***Sporobolus wrightii***
14b. Leaf sheath margins hairy; blades spreading . . . . . (222) ***Setaria viridis***

GROUP 20. LEAF BLADE APICES ATTENUATE

1a. Leaf blades convolute or bristlelike . . . . . (256) ***Stipellula parviflora***
1b. Leaf blades not convolute or bristlelike 2

2a. Culm internodes ridged . . . . . (139) ***Festuca bromoides***
2b. Culm internodes smooth 3
3a. Leaf sheath surfaces hairy . . . . . (206) ***Rostraria hispida***
3b. Leaf sheath surfaces glabrous 4
4a. Leaf blade bases cordate or amplexicaul . . . . . (81) ***Cymbopogon martini***
4b. Leaf blade bases not cordate or amplexicaul 5
5a. Culm nodes bearded; ligules erose . . . . . (83) ***Cymbopogon schoenanthus***
5b. Culm nodes not bearded; ligules not erose 6
6a. Ligules less than 2 mm long; blade surfaces pilose on both sides . . . . . (102) ***Dinebra panicea***
6b. Ligules 3–8 mm long; blade surfaces glabrous or scaberulous . . . . . (82) ***Cymbopogon nardus***

GROUP 21. CULM NODES BEARDED

1a. Leaf blades lanceolate, ligules obtuse . . . . . (100) ***Digitaria velutina***
1b. Leaf blades linear, ligules acute or acuminate 2
2a. Butt sheaths woolly; leaf sheath margins membranous . . . . . (37) ***Bromus lanceolatus***
2b. Butt sheath not woolly; leaf sheath margins not membranous 3
3a. Culms solitary; leaf blade surfaces glabrous . . . . . (226) ***Sorghum virgatum***
3b. Culms caespitose; leaf blade surfaces hairy 4
4a. Ligules lacerate; leaf blade margins ciliate . . . . . (25) ***Brachypodium distachyon***
4b. Ligules erose; leaf blade margins scabrous . . . . . (34) ***Bromus hordeaceus***

GROUP 22. LEAF BLADE MARGINS GLABROUS, SMOOTH

1a. Leaf sheath surfaces glandular . . . . . (103) ***Dinebra retroflexa***
1b. Leaf sheath surfaces eglandular 2
2a. Ligules 3–6 mm long . . . . . (41) ***Bromus pulchellus***
2b. Ligules less than 3 mm long 3
3a. Culm internodes striate 4
3b. Culm internodes smooth 5
4a. Ligules lacerate; leaf blades ascending . . . . . (32) ***Bromus diandrus***
4b. Ligules erose; leaf blades flaccid . . . . . (30) ***Bromus catharticus***
5a. Leaf blade surfaces hairy 6
5b. Leaf blade surfaces scabrous or glabrous 7
6a. Culm nodes swollen; plants solitary . . . . . (28) ***Bromus aegyptiacus***
6b. Culm nodes not swollen; plants caespitose . . . . . (29) ***Bromus alopecuros***
7a. Leaf sheath surfaces hairy, oral hairs ciliate . . . . . (97) ***Digitaria ciliaris***
7b. Leaf sheath surfaces glabrous, oral hair lacking 8
8a. Leaf blade apices abruptly acute; rhizomes short . . . . . (93) ***Desmazeria philistaea***
8b. Leaf blade apices acute; rhizomes absent 9
9a. Leaf blade surfaces glabrous, bases simple . . . . . (191) ***Phleum pratense***
9b. Leaf blade surfaces scabrous, bases truncate . . . . . (226) ***Sorghum virgatum***

GROUP 23. LIGULES ABSENT OR LESS THAN 3 MM LONG

1a. Ligules absent . . . . . (106) ***Echinochloa crus-galli***
1b. Ligules present 2
2a. Culms wiry; blades involute . . . . . (141) ***Festuca myuros***
2b. Culms not wiry; blades not involute 3
3a. Leaf blade margins cartilaginous . . . . . (209) ***Rostraria rohlfsii***
3b. Leaf blade margins not cartilaginous 3
4a. Leaf blades apices abruptly acute . . . . . (208) ***Rostraria pumila***
4b. Leaf blades apices not abruptly acute 5
5a. Leaf sheath margins sparsely hairy . . . . . (45) ***Bromus sterilis***
5b. Leaf sheath margins not sparsely hairy 6

6a. Leaf blade midrib conspicuous above . . . . . (182) ***Paspalum dilatatum***
6b. Leaf blade midrib not conspicuous above 7
7a. Butt sheaths pubescent; leaf blade surfaces sparsely hairy . . . . . (36) ***Bromus japonicus***
7b. Butt sheath glabrous; leaf blade surfaces not sparsely hairy 8
8a. Leaf blade margins tuberculate . . . . . (22) ***Avena longiglumis***
8b. Leaf blade margins not tuberculate 9
9a. Leaf blades revolute . . . . . (47) ***Catapodium rigidum***
9b. Leaf blades not revolute 10
10a. Leaf sheath margins membranous 11
10b. Leaf sheath margins not membranous 12
11a. Leaf blade bases truncate; plants perennial . . . . . (205) ***Rostraria cristata***
11b. Leaf blade bases simple; plants annual . . . . . (265) ***Trichoneura mollis***
12a. Leaf blade margins sparsely hairy . . . . . (44) ***Bromus scoparius***
12b. Leaf blade margins not sparsely hairy 13
13a. Ligules lacerate . . . . . (197) ***Poa diaphora***
13b. Ligules not lacerate 14
14a. Culms decumbent; leaf blades spreading, flaccid . . . . . (192) ***Phleum subulatum***
14b. Culms erect or geniculate; leaf blades ascending, reflexed . . . . . (202) ***Polypogon maritimus***

GROUP 24. LIGULES 3–6 MM LONG

1a. Butt sheaths woolly 2
1b. Butt sheaths glabrous or pubescent 3
2a. Oral hairs ciliate; blades spreading, bases simple . . . . . (46) ***Bromus tectorum***
2b. Oral hairs lacking; blades ascending, bases truncate . . . . . (43) ***Bromus rubens***
3a. Culm internodes striate 4
3b. Culm internodes smooth 5
4a. Leaf sheath surfaces glabrous, ligules erose . . . . . (26) ***Briza maxima***
4b. Leaf sheath surfaces hairy, ligules truncate . . . . . (27) ***Briza minor***
5a. Oral hairs lacking . . . . . (21) ***Avena fatua***
5b. Oral hairs ciliate 6
6a. Leaf blades curled or flexuous, margins tuberculate . . . . . (23) ***Avena sativa***
6b. Leaf blades not curled or flexuous, margins not tuberculate 7
7a. Ligules erose, dentate . . . . . (20) ***Avena barbata***
7b. Ligules not erose, lacerate 8
8a. Ligules lacerate . . . . . (46) ***Bromus tectorum***
8b. Ligules truncate . . . . . (24) ***Avena sterilis***

ALTERNATIVE KEY TO GROUP 24

1a. Nodes pubescent 2
1b. Nodes not pubescent 3
2a. Oral hairs ciliate . . . . . (23) ***Avena sativa***
2b. Oral hairs lacking . . . . . (21) ***Avena fatua***
3a. Leaf sheath surfaces glabrous . . . . . (26) ***Briza maxima***
3b. Leaf sheath surfaces not glabrous 4
4a. Ligule apices erose . . . . . (20) ***Avena barbata***
4b. Ligule apices not erose 5
5a. Leaf blade surfaces hairy above and below . . . . . (43) ***Bromus rubens***
5b. Leaf blade surfaces not hairy above and below 6
6a. Leaf sheaths open, surfaces ribbed . . . . . (24) ***Avena sterilis***
6b. Leaf sheaths not open, not ribbed 7
7a. Culm nodes dark colored; leaf sheath margins membranous . . . . . (27) ***Briza minor***
7b. Culm nodes not dark colored; leaf sheath margins not membranous . . . . . (46) ***Bromus tectorum***

Descriptions



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

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

FIGURE 10

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

Caespitose annuals. Culms 15–40 cm tall, decumbent and geniculate, lateral branching sparse; internodes glabrous; nodes dark, occasionally rooting below; butt sheaths sparsely hairy. Leaves basal and cauline; sheaths glabrous, keeled; ligules 1.5 mm long, membranous, apex ciliate; blades 5–10 cm long, 1.5–3 mm wide, flat, filiform wiry, sparsely hairy, margins cartilaginous, apex attenuate. Inflorescence branches 1.5–10 cm long, digitate to subdigitately arranged along a central axis, unilateral; rachis 0–15 cm long, angular. Spikelets 5.5–13 mm long, 2.5–3 mm wide, oblong, laterally compressed; principal lemma awns 0.3–0.9 mm long, straight. Habitat: margins of cultivated (corn) fields. Distribution: (Nv) tropical Africa.

2. *Aegilops bicornis* (Forssk.) Jaub. & Spach

FIGURE 11

Aegilops bicornis (Forssk.) Jaub. & Spach, Ill. Pl. Orient. 4: 11, t. 309. 1850.
Common names: *sha'eer eblis, sha'eer el far*; goatgrass.

Caespitose annuals. Culms 15–50 cm tall, erect, geniculate, wiry, striate, glabrous, glossy; nodes dark. Leaves basal and cauline; sheaths flattened, glabrous; auricles 2 mm long; falcate; ligules 1–1.6 mm long, membranous, apex truncate; blades 3–10 cm long, 1–3 mm wide, flat or folded, linear, sparsely hairy, margins hairy, apex acute. Spikes 5–8 cm long, single, linear, bilateral. Spikelets 5.5–8.5 mm long, embedded in rachis, elliptic, laterally compressed; principal lemma awns 30–60 mm long,

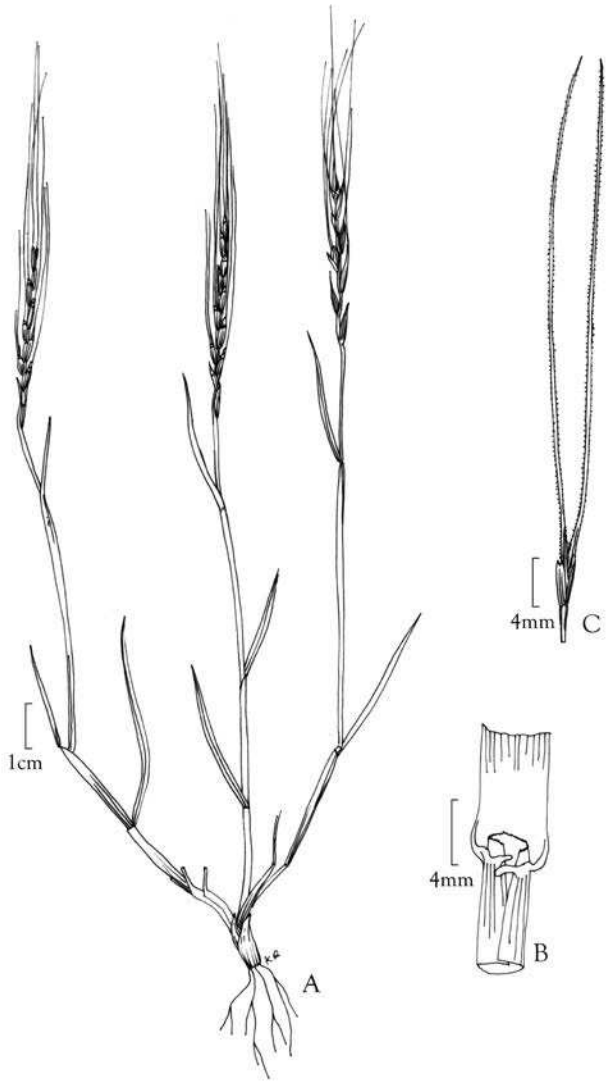


FIGURE 11. *Aegilops bicornis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *C. G. Ehrenberg* (US-730880).

straight, scabrous. Habitat: sandy soils. Distribution: (Mm, Ms) Sahara and Arabian Deserts.

3. *Aegilops geniculata* Roth

FIGURE 12

Aegilops geniculata Roth, Bot. Abh. 45. 1787.
Common names: *gamh-el hagal, hagal, sabal el far*; ovate goatgrass.

Caespitose annuals. Culms 10–30 cm tall, erect, geniculate; internodes glabrous, straw colored; butt sheaths glabrous. Leaves

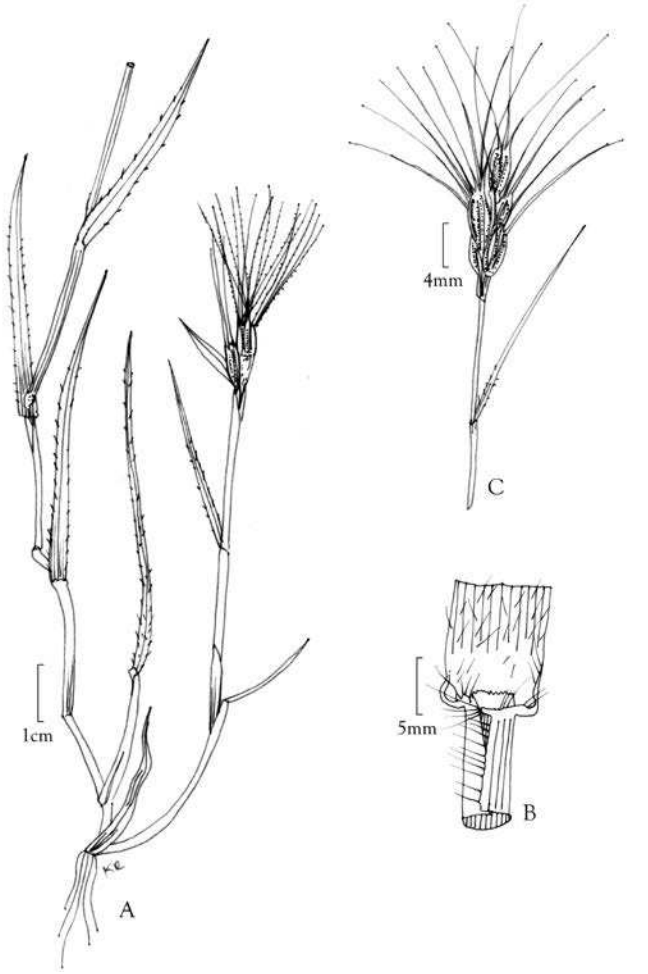


FIGURE 12. *Aegilops geniculata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A drawn from *V. Täckholm s.n.* (CAI); B drawn from *A. Charpin, M. Dittrich, W. Greufer & P. Hainard s.n.* (US-2646141).

basal and cauline; sheaths hairy, flattened; oral hairs present; auricles 2 mm long, falcate; ligules less than 3 mm long, membranous, truncate; blades 4–8 cm long, 1–3 mm wide, linear-lanceolate, ascending, stiff, pubescent, margins ciliate, apex acute. Spikes 1–2 cm long, 4–9 mm wide, erect, obovate, bilateral. Spikelets 7–11 mm long, embedded in rachis, ovate, laterally compressed; glumes 3–4 (8)–awned; principal lemma awns 10–25 mm long, straight, scabrid. Habitat: disturbed areas. Distribution: (Mm, Ms) S Europe and Africa, N of Sahara to SW Asia.

4. *Aegilops kotschyi* Boiss.

FIGURE 13

Aegilops kotschyi Boiss., Diagn. Pl. Orient., ser. 1, 7: 129. 1846.
Common name: *sha'eer el far*.



FIGURE 13. *Aegilops kotschyi*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Maire s.n.* (CAI); B, C drawn from *Alizzi and Husain 33786* (US-3048203).

Caespitose annuals. Culms 15–25 cm tall, erect, geniculate; internodes glabrous, glossy; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blades, sparsely hairy; auricles 2 mm long, falcate; ligules less than 3 mm long, membranous, lacerate; blades 2.5–6 cm long, 1–2 mm wide, linear, conduplicate, ascending, stiff, glabrous, pilose or sparsely hairy, margins ciliate, bases rounded, apex acute. Spikes 0.5–4 cm long, 2.5–5 mm wide, single, lanceolate, bilateral; glumes 1–4-awned. Spikelets 7–10 mm long, embedded in rachis, oblong, laterally compressed; principal lemma awns 5–15 mm long, straight, scabrid. Habitat: sandy soils. Distribution: (Mm, Ms, Di) E Mediterranean to Caucasia.

5. *Aegilops longissima* Schweinf. & Muschl.

FIGURE 14

Aegilops longissima Schweinf. & Muschl., Man. Fl. Egypt 1: 156. 1912.

Common name: goatgrass.

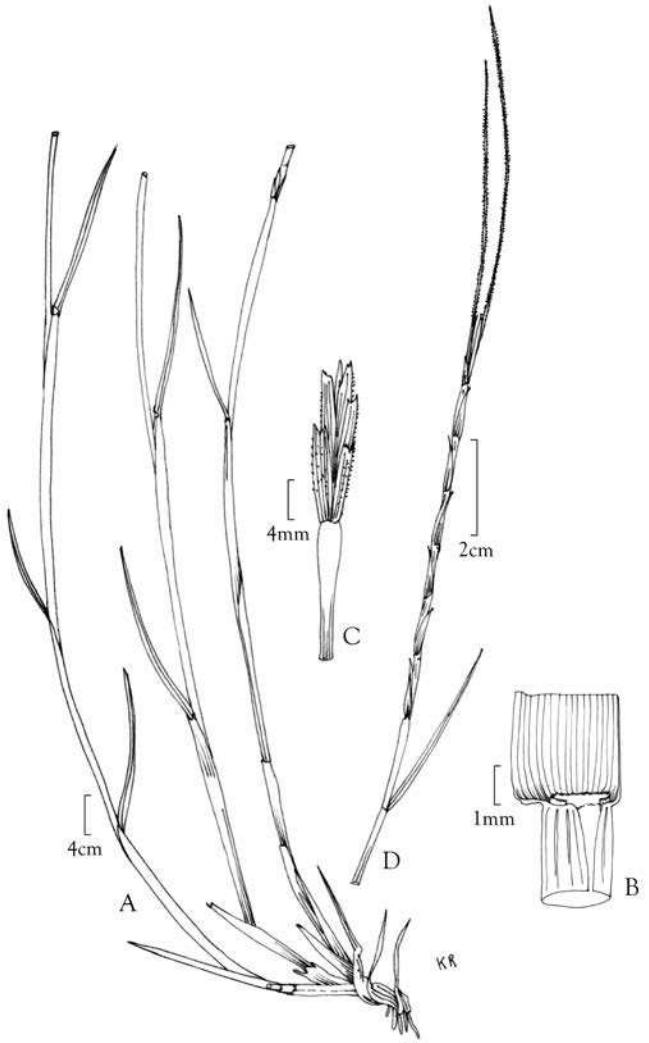


FIGURE 14. *Aegilops longissima*. A. Habit B. Ligule, sheath, and blade C. Spikelet. D. Inflorescence. A, C drawn from *G. Maire s.n.* (CAI); B, D drawn from *Bornmuller s.n.* (US-1129639).

Caespitose annuals. Culms 50–100 cm tall, erect, geniculate, internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blades, sparsely hairy, oral hairs present; auricles 2 mm long, falcate; ligules less than 3 mm long, membranous, truncate; blades 3–10 cm long, 2–4 mm wide, linear, flat, spreading, glabrous or pilose, margins ciliate, bases broadly rounded, apex acute. Spikes up to 10 cm long. Spikelets 12–14 mm long, oblong, laterally compressed, embedded in rachis; glumes awnless; principal lemma awns 3–10 mm long. Habitat: sandy field margins. Distribution: (Mm, Ms) E Mediterranean.

6. *Aegilops peregrina* (Hack.) Eig

FIGURE 15

Aegilops peregrina (Hack.) Eig, Repert. Spec. Nov. Regni Veg. Beih. 55: 121. 1929.
Common name: goatgrass.

Caespitose annuals. Culms 10–40 cm tall, erect, geniculate below, internodes glabrous, straw colored; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blades, glabrous, striate, oral hairs present; auricles falcate; ligules less than 3 mm long, eciliate membrane, truncate; blades 2.5–10 cm long, 1.5–3 mm wide, linear, flat, spreading, pubescent on both sides, margins smooth, bases broadly rounded, apex acute. Spikes 1–2 cm long, erect, single, lanceolate or ovate, bilateral. Spikelets 5–7 mm long, oblong or ovate, laterally compressed, embedded in rachis; glumes 2- or 3-awned, the awns 15–50 mm long; principal lemma awns 2–30 mm long. Habitat: sandy areas. Distribution: (Ms, S) Mediterranean.

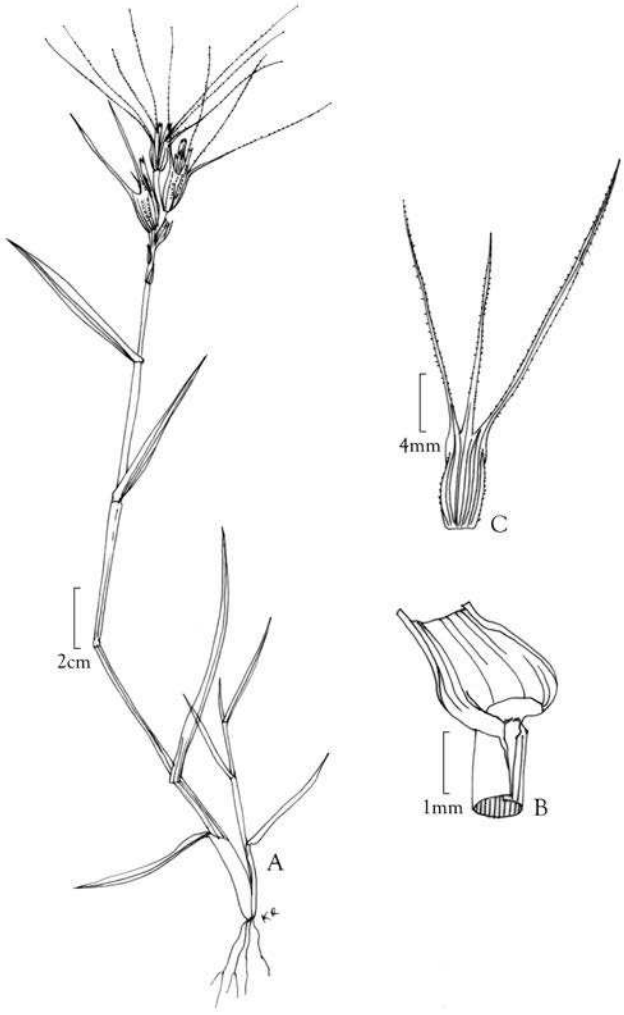


FIGURE 15. *Aegilops peregrina.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, N. El Hadidi, H. Fawzy s.n.* (CAI); B, C drawn from *C. G. Ehrenberg s.n.* (US-1129362).

7. *Aegilops ventricosa* Tausch

FIGURE 16

Aegilops ventricosa Tausch, Flora 20: 108. 1837.
Common name: barbed goatgrass.

Caespitose annuals. Culms 30–70 cm tall, erect or slightly geniculate below; internodes glabrous, straw colored; nodes swollen; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, oral hairs present; auricles 2 mm long, falcate; ligules less than 3 mm long, membranous, truncate; blades 12–15 cm long, 2–7 mm wide, linear, flat, spreading; pilose on both sides,

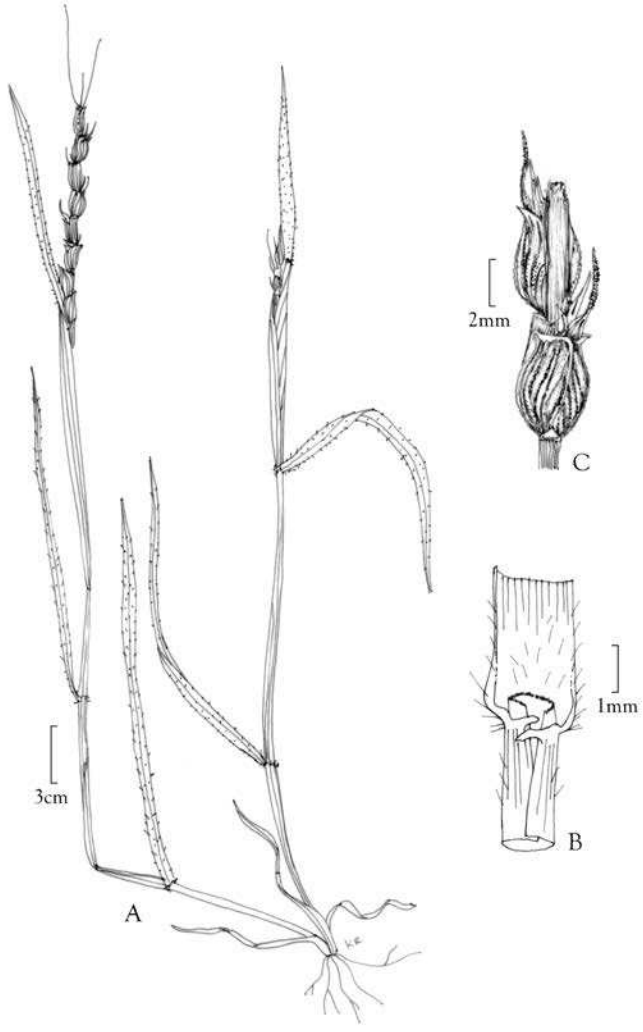


FIGURE 16. *Aegilops ventricosa.* A. Habit. B. Ligule, sheath, and blade. C. Portion of inflorescence. A drawn from *L. Boulos 1566* (CAI); B, C drawn from *Izovits* (US-1018366), *L. Trabut 194* (US-1018388).

margins smooth, apex acute. Spikes 5 cm long, linear, or moniliform, bilateral. Spikelets 5–14 mm long, embedded in rachis; glumes 3-awned; principal lemma awns 50–95 mm long. Habitat: weed in barley fields. Distribution: (Mm) Mediterranean.

8. *Aeluropus lagopoides* (L.) Trin. ex Thwaites

FIGURE 17

Aeluropus lagopoides (L.) Trin. ex Thwaites, Enum. Pl. Zeyl. 374. 1864.
Common names: *mulleih*, *negil shaitani*.

Sward-forming perennials sometimes with long creeping stolons; rhizomes elongated and scaly. Culms 5–20 cm tall, erect, geniculate or prostrate; internodes glabrous; butt sheaths woolly. Leaves basal and cauline, distichous; sheaths longer than adjacent internodes, open, sparsely hairy, margins scabrous; ligules less than 3 mm long, ciliolate membranes; blades 0.4–0.8 cm long, 1–2 mm wide, lanceolate, revolute, straight-distichous, ribbed, scabrous on both sides, margins scabrous, bases broadly rounded, apex acuminate or spiny and pungent. Panicles 0.5–1 cm long, ellipsoid, globose, of a single or a few branches. Spikelets 3–6 mm long, oblong, laterally compressed, breaking up at maturity; lemmas awnless. Habitat: dry to damp, fresh water and saline areas. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, Ol, On, S, Rq, Rz, Ra, Ge) Mediterranean region to India.

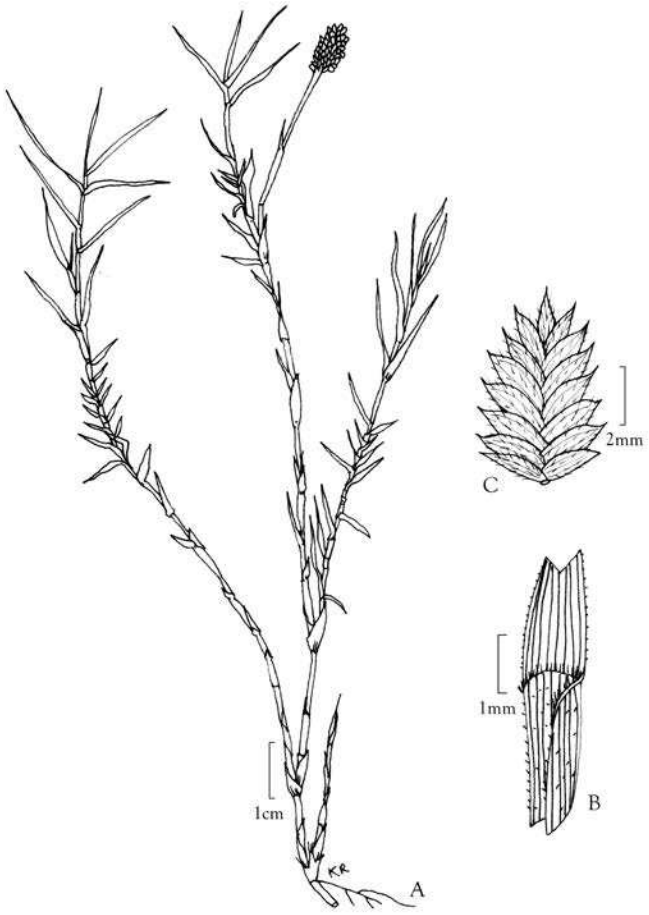


FIGURE 17. *Aeluropus lagopoides*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm 1483* (CAI); B, C drawn from *Wolfe s.n.* (US-2461102).

9. *Aeluropus littoralis* (Gouan) Parl.

FIGURE 18

Aeluropus littoralis (Gouan) Parl., Fl. Ital. 1: 461. 1848.
Common names: *negeil*; Mediterranean salt grass.

Stoloniferous perennials; rhizomes elongated. Culms 5–30 cm tall, prostrate, creeping; internodes glabrous; butt sheaths

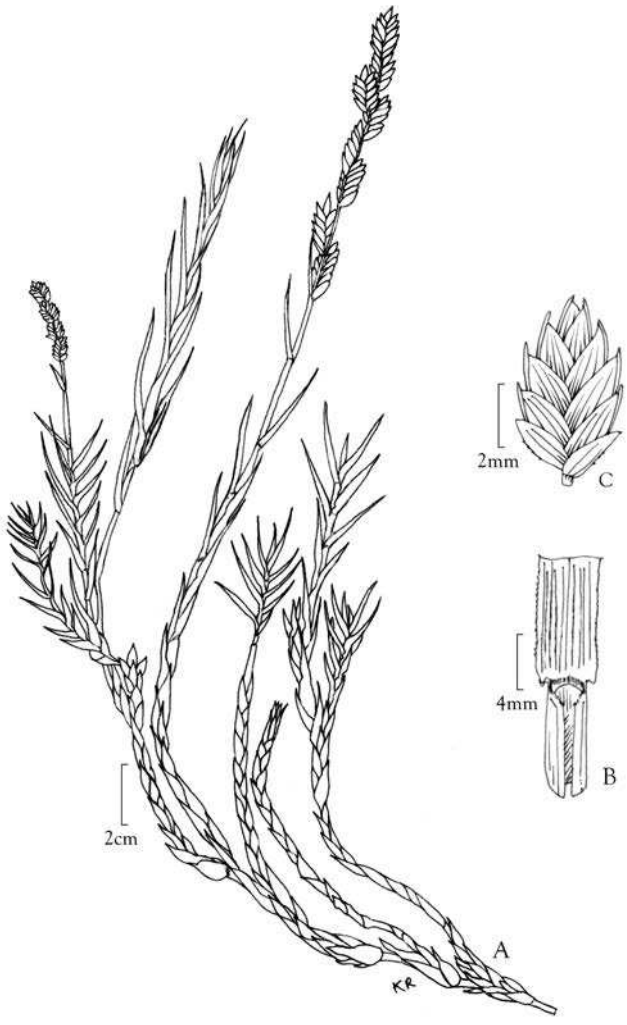


FIGURE 18. *Aeluropus littoralis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Biskra 645* (CAI); B drawn from *H. S. Thompson s.n.* (US-1162443); C drawn from *T. De Heldreich s.n.* (US-913974).

glabrous. Leaves basal and cauline, distichous; sheaths longer than adjacent internodes, sparsely hairy, margins hairy; ligules less than 3 mm long, ciliolate membranes; blades 1–5 cm long, 1–3 mm wide, coriaceous, linear, convolute, straight, rigid, ribbed, sparsely hairy, margins smooth, apex attenuate, spiny and pungent. Panicles 0.5–1 cm long, erect, ellipsoid with 4–12 branches, each bearing up to 12 spikelets. Spikelets 3–4.5 mm long, ovate, laterally compressed, breaking up at maturity; lemmas awnless. Habitat: sandy and saline soils. Distribution: (S, Ra) Mediterranean region to E Asia.

10. *Agropyron cristatum** (L.) Gaertn.

FIGURE 19

*Agropyron cristatum** (L.) Gaertn., Novi Comment. Acad. Sci. Imp. Petrop. 14: 540. 1770.
Common names: *gazouf, sayfoun*; crested wheatgrass.

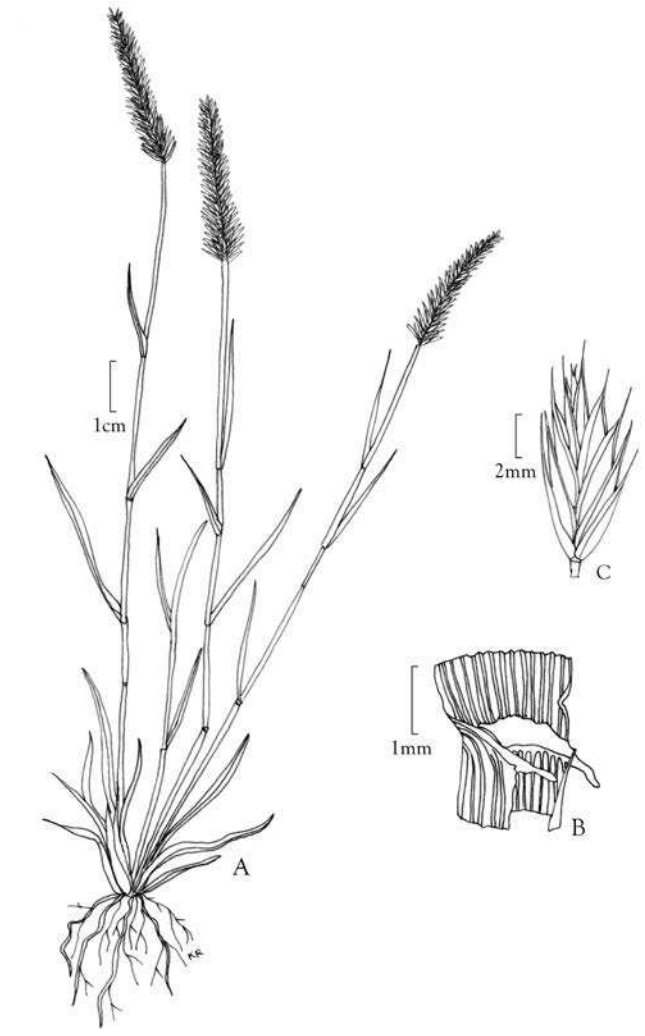


FIGURE 19. *Agropyron cristatum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *J. Barrell & S. Spongberg 353-62* (US-2872773).

Caespitose perennials. Culms 10–30 cm tall, decumbent; internodes glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; auricles 2 mm long, falcate; ligules 1.5–2 mm long, membranous, truncate scabrid or pilose above; blades 5–10 cm long, 1–4 mm wide, linear, involute, scabrid or pilose above, glabrous below or pubescent on both sides, margins cartilaginous, apex attenuate, sometimes spiny and pungent. Panicles 1–5 cm long, ellipsoid, racemes single, oblong, bilateral. Spikes 8–15 mm long, oblong. Spikelets 7–16 mm long, diverging at right angles at maturity; glumes 1-awned; principal lemma awns 3–4 mm long, scabrous. Habitat: sandy soils. Distribution: (Mm) central (C) Europe, Mediterranean region, and temperate Asia.

11. *Agrostis stolonifera** L.

FIGURE 20

*Agrostis stolonifera** L., Sp. Pl. 1: 62. 1753.
Common name: creaping bentgrass.

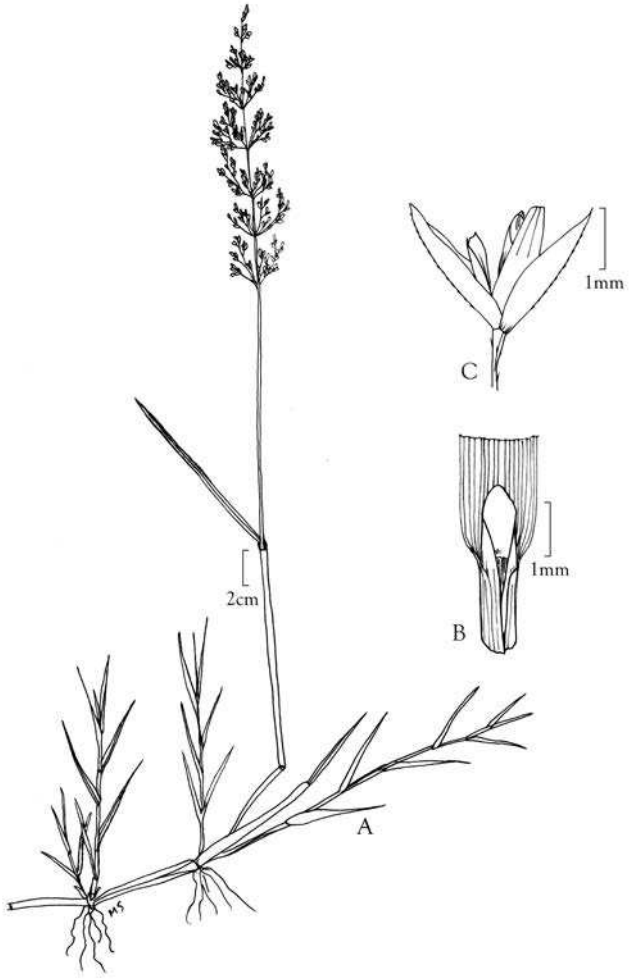


FIGURE 20. *Agrostis stolonifera.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *E. Evers s.n. & M. Hassib s.n.* (CAI); B and C drawn from *W. Koelz 16325* (US-3041635).

Stoloniferous perennials. Culms up to 70 cm tall, weak, erect; nodes dark, swollen, lower nodes rooting; internodes glabrous, striate; butt sheaths glabrous. Leaves basal and cauline; sheaths overlapping, glabrous, margins membranous; auricles falcate; ligules 1–3 mm long, membranous, acute; blades 5–15 cm long, 2–10 mm wide, linear, flat, straight or spreading, scaberulous, ribbed, apex acuminate. Panicles 1–13 cm long, 0.4–2.5 cm wide, open or contracted, linear, lanceolate or oblong, continuous or interrupted, dense or loose; primary branches whorled at most nodes. Spikelets 2–3 mm long, lanceolate or oblong, laterally compressed; pedicels 0.5–2 mm long, filiform; lemmas awnless. Habitat: aquatic or moist habitats. Distribution: (Di) Europe and temperate Asia.

12. *Alopecurus myosuroides** Huds.

FIGURE 21

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

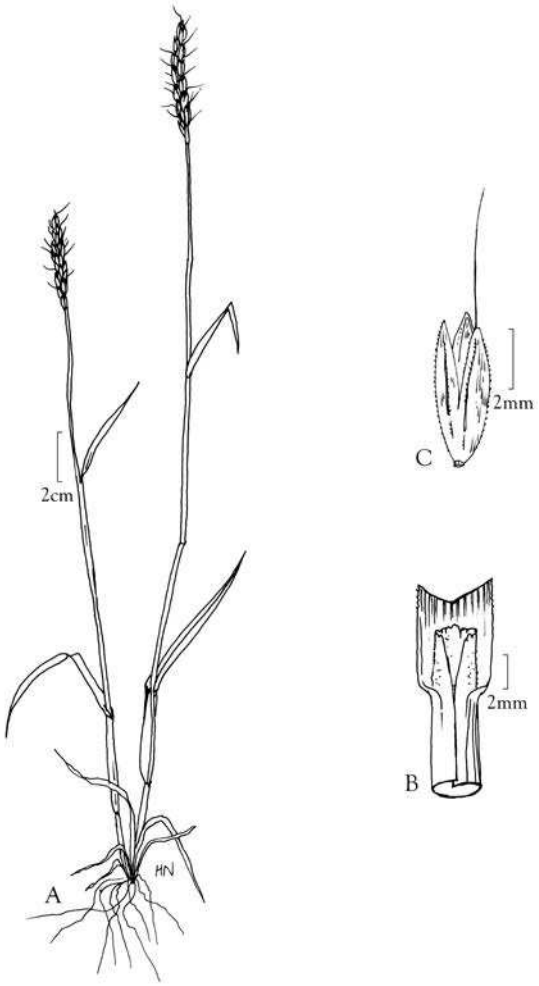


FIGURE 21. *Alopecurus myosuroides*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *A. Chase 6127* (US-730450).

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, membranous, 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. Habitat: cultivated and waste areas. Distribution: (Mm, Nv, Di) Europe and temperate Asia.

13. *Ammochloa palaestina* Boiss.

FIGURE 22

Ammochloa palaestina Boiss., Diagn. Pl. Orient., ser. 1, 13: 52. 1854.

Mat-forming annuals. Culms 0.5–8 cm tall, prostrate; internodes glabrous; nodes swollen; butt sheaths glabrous. Leaves

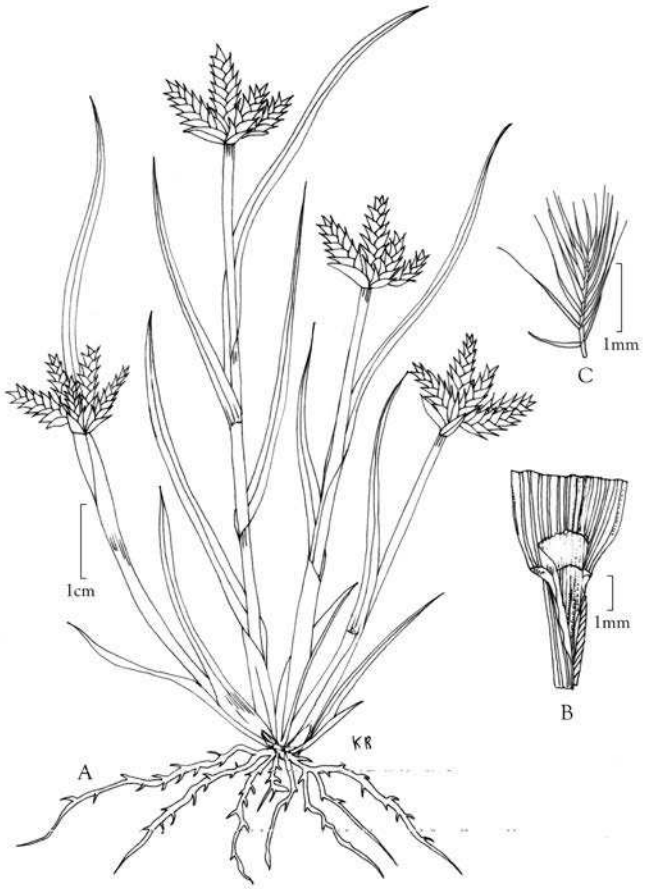


FIGURE 22. *Ammochloa palaestina*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos & Ads 14164* (CAI); B, C drawn from *E. Palmer & F. A. Barkley 611* (US-2381349).

mostly basal; sheaths loose or inflated, glabrous, margins membranous; auricles obtuse; ligules 1.5 mm long, membranous, truncate; blades 2–6 cm long, 1–2 mm wide, linear, flat, straight, glabrous, margins smooth, apex acute. Panicles ellipsoid or ovoid, capitate, shorter than basal leaves. Spikelets 8–15 mm long, oblong, laterally compressed; glumes 2.6–4.2 mm long; lemmas awnless. Habitat: calcareous and sandy soils. Distribution: (Mm, Ms, Nv) S Europe, N Africa to Iran.

14. *Ammophila arenaria* (L.) Link

FIGURE 23

Ammophila arenaria (L.) Link, Hort. Berol. 1: 105. 1827.
Common names: *gazouf*; marram grass.

Caespitose perennials; rhizomes elongated; sand usually adhering to the roots. Culms 60–150 cm tall, erect, stout, reedlike;

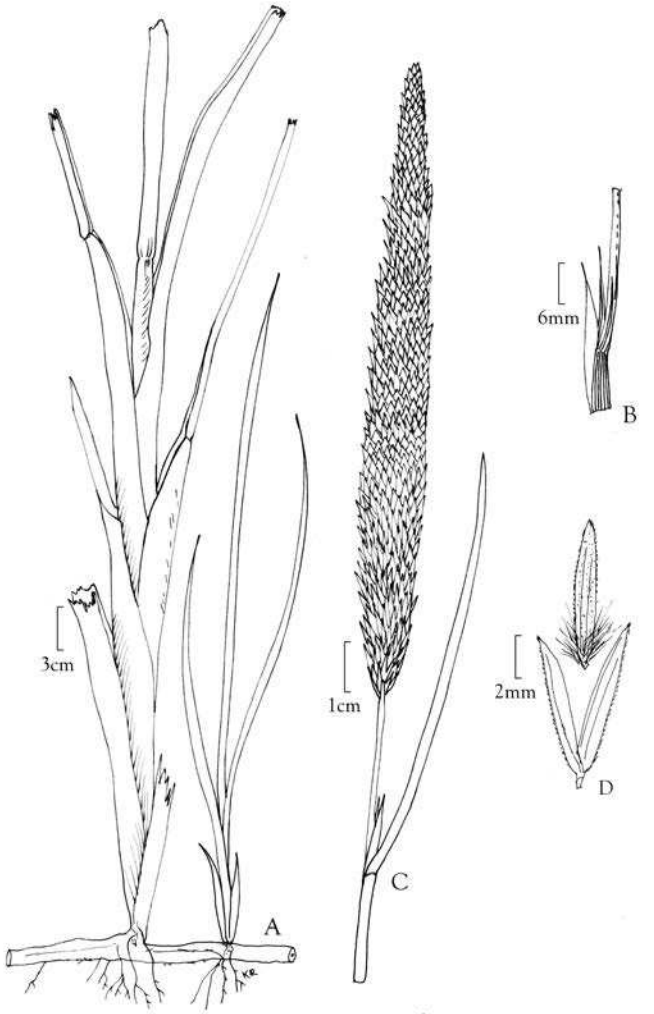


FIGURE 23. *Ammophila arenaria.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B–D drawn from *T. Williams s.n* (US-221940).

internodes glabrous, glossy; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous; ligules 10–30 mm long, membranous, acute; blades 10–60 cm long, 2–50 mm wide, linear, revolute, ascending, stiff, ribbed, pubescent, margins entire, apex pungent. Panicles 7–22 cm long, 1–2.5 cm wide, erect, spiciform, oblong, tapering above. Spikelets 10–16 mm long, lanceolate, laterally compressed; lemmas awnless. Habitat: coastal sandy areas. Distribution: (Mm, Ms) W Europe.

15. *Andropogon distachyos* L.

FIGURE 24

Andropogon distachyos L., Sp. Pl. 2: 1046. 1753.
Common name: two-spiked bread grass.

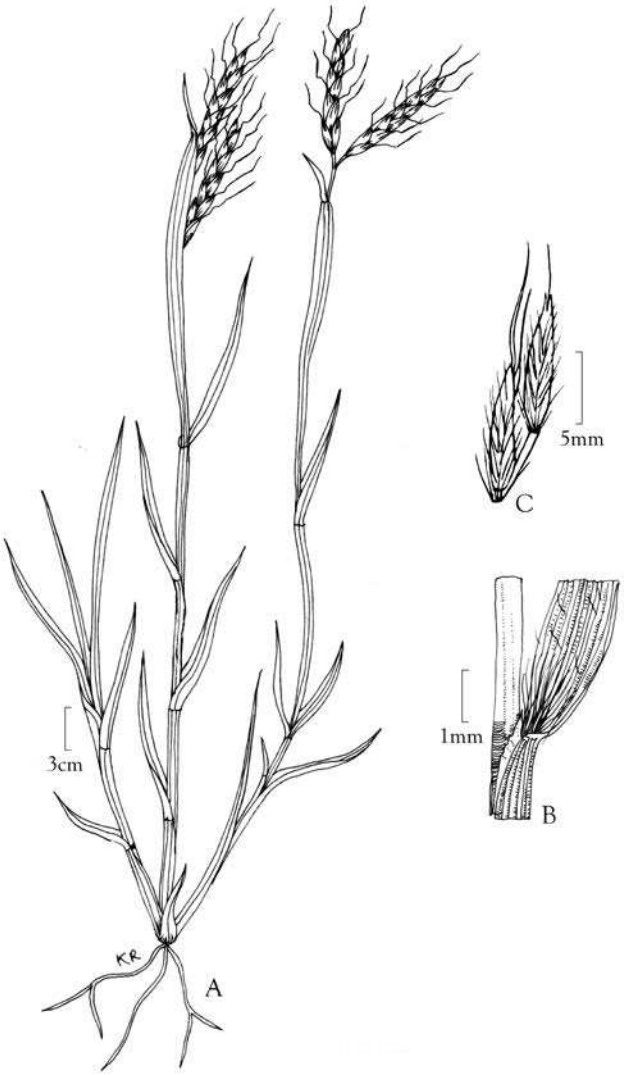


FIGURE 24. *Andropogon distachyos.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A, C drawn from *J. R. Akeryd 346* (CAI), Ibrahim and Kabuye (1988); B, drawn from *J. Mildbread 10852* (US-1535473), *A. Pappi s.n.* (US-2523698).

Caespitose perennials. Culms up to 100 cm tall, erect, weak; nodes dark; internodes glabrous; butt sheaths sparsely hairy. Leaves basal and cauline; sheath margins closed, sparsely hairy; ligules 0.5–1 mm long, fringe of hairs; blades 5–20 cm long, 5–10 mm wide, linear, flat, ascending, sparsely hairy, margins smooth, apex acute. Rames 4–14 cm long, paired, rachis fragile at the nodes, ciliate on margins; internodes linear or slightly clavate. Spikelets in pairs; fertile spikelets 8–16 mm long, dorsally compressed; glumes 1-awned, the awn 3–9 mm long; lemmas 1-awned, the awns 15–30 mm long, geniculate with twisted column. Habitat: sandy soils. Distribution: (S) tropical and S Africa, Mediterranean to Arabia.

16. *Aristida adscensionis* L.

FIGURE 25

Aristida adscensionis L., Sp. Pl. 1: 82. 1753.
Common names: *sabal abu el-hosein*; sixweeks threeawn.

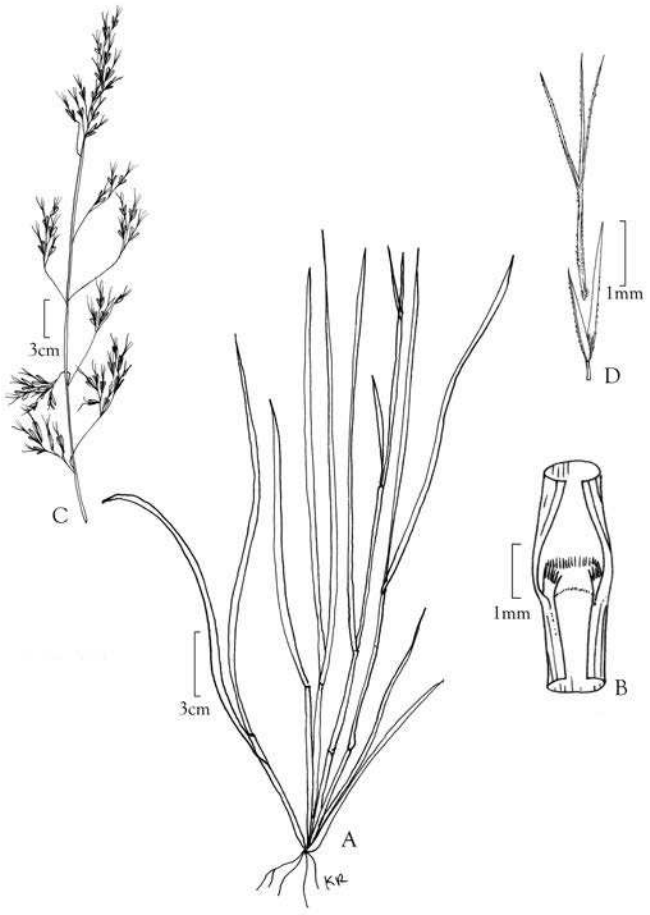


FIGURE 25. *Aristida adscensionis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm, M. Kassas, F. Shalaby, M. Samy, M. Zahran* (CAI); B–D drawn from *G. A. Mensah 476* (US-2209026).

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

17. *Aristida funiculata* Trin. & Rupr.

FIGURE 26

Aristida funiculata Trin. & Rupr., Sp. Gram. Stipac. 159. 1842.

Caespitose annuals. Culms 15–25 cm tall, erect, weak, wiry, geniculate; internodes glabrous; butt sheaths glabrous, forming bulbs. Leaves mostly basal; sheaths open, glabrous, margins

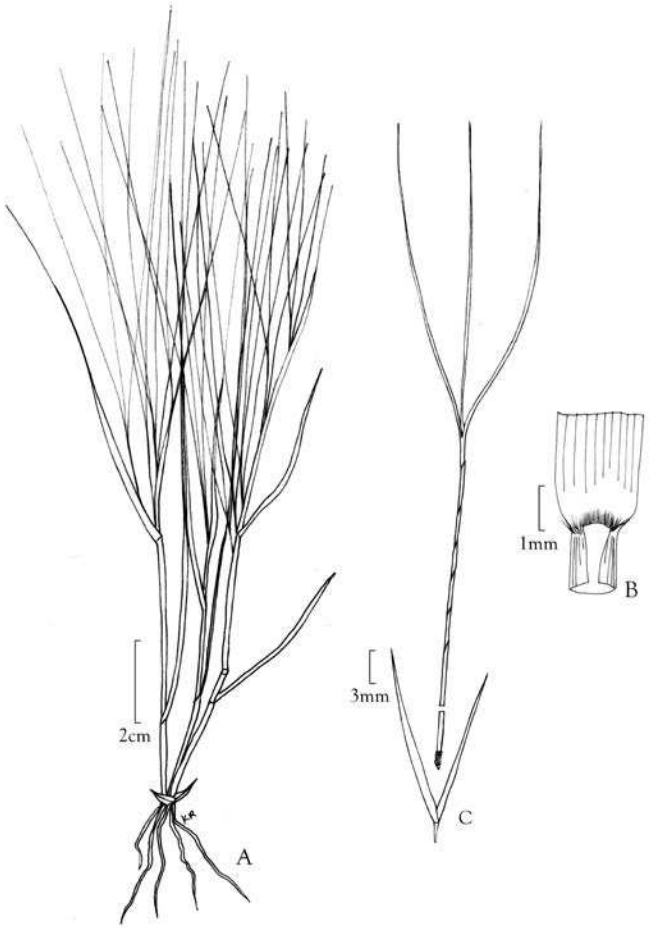


FIGURE 26. *Aristida funiculata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *S. Laegaard & S. Traore 17915* (US-3595195).

smooth; ligules 0.5–1 mm long, a fringe of hairs; blades 5–20 cm long, 1–3 mm wide, linear, convolute or folded, stiff, appressed, glabrous, margins smooth, apex acuminate. Panicles 5–10 cm long, contracted, scarcely exerted from the uppermost sheath, terminal and axillary, erect. Spikelets 20–30 mm long, lanceolate, subterete; lemmas 3-awned, the awns 35–45 mm long, the column 2–4.5 cm long, twisted. Habitat: sandy soils. Distribution: (Ra, Ge) tropical Africa to India.

18. *Aristida mutabilis* Trin. & Rupr.

FIGURE 27

Aristida mutabilis Trin. & Rupr., Sp. Gram. Stipac. 150. 1842.
Common name: *adar hamoreit*.

Caespitose annuals. Culms 10–40 cm tall, erect, weak, geniculate; nodes dark; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, margins smooth; oral hairs present; ligules 0.5–1 mm long, fringe of hairs; blades 2–7 cm long, 1–2 mm wide, linear, convolute, stiff, surfaces glabrous, margins smooth, apex acuminate. Panicles

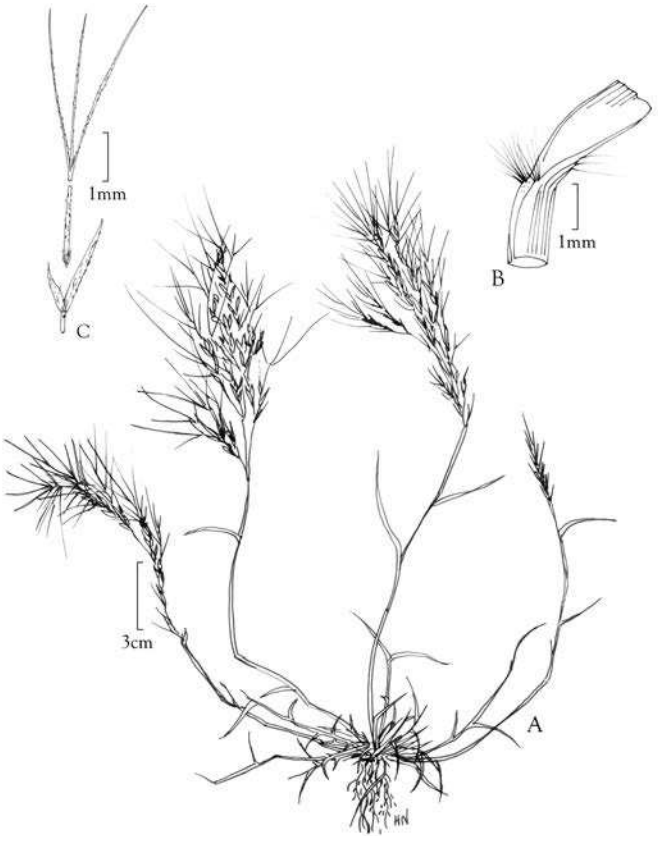


FIGURE 27. *Aristida mutabilis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *V. Täckholm 1685* (CAI), Ibrahim and Kabuye (1988); B drawn from *J. Ash 2991* (US-2837041).

5–10 cm long, open, linear, erect, terminal and axillary. Spikelets 6–7 mm long, lanceolate, subterete; lemmas 3-awned, awns 10–30 mm long, the column 3–5(–6.8) mm long, twisted. Habitat: sandy soils. Distribution: (Da, Ra, Ge) tropical Africa to India.

19. *Arundo donax** L.

FIGURE 28

*Arundo donax** L., Sp. Pl. 1: 81. 1753.
Common names: *ghab*; giant reed, nalgrass.

Solitary perennials; rhizomes long, creeping. Culms 2–4 m tall, erect, woody, bamboo-like; internodes glossy; butt sheaths glabrous. Leaves basal and cauline, conspicuously distichous, glabrous, margins membranous, oral hairs ciliate; ligules 2 mm long, ciliolate membranes; blades 10–50 cm long, 5–70 mm wide, linear-lanceolate, flat, drooping, cartilaginous, hairy on

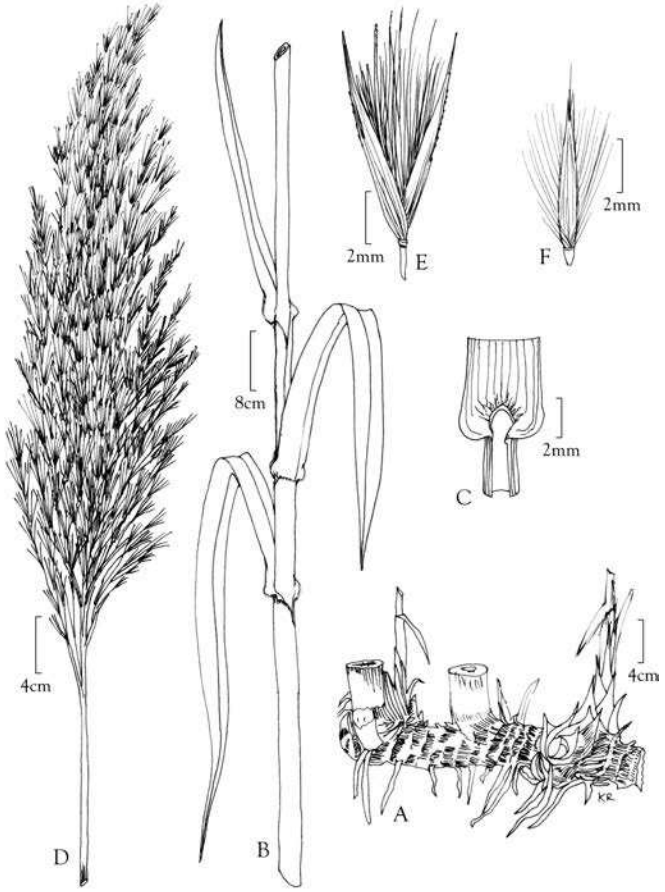


FIGURE 28. *Arundo donax*. A. Rhizome. B. Culm. C. Ligule, sheath, and blade. D. Inflorescence. E. Spikelet. F. Floret. A, B modified from Hitchcock (1951); *C. G. Schweinfurth s.n.* (US-806224); D–F drawn from *G. Griffith s.n.* (US-2322770).

basal third, margins smooth, bases rounded or cordate, apex attenuate. Panicles 30–60 cm long, terminal, contracted, oblong; primary branches profusely divided, scaberulous. Spikelets 8–15 mm long, cuneate, laterally compressed; lemmas awnless. Habitat: waste places. Distribution: (Mm, Ms, Nv, Di, Ol, S) Mediterranean region to SE Asia.

20. *Avena barbata* Pott ex Link

FIGURE 29

Avena barbata Pott ex Link, J. Bot. (Schrader) 2: 314–315. 1799 [1800].
Common names: *bahma, sheifun, zommeir*; slender oat.

Caespitose or solitary annuals. Culms 30–100 cm tall, erect; internodes glossy; butt sheaths glabrous. Leaves mostly basal; sheaths hairy, margins membranous, oral hairs present; ligules 3–6 mm long, membranous, apex erose, lacerate; blades 4–25 cm long, 2–4 mm wide, linear, flat, spreading, glabrous, pilose or sparsely hairy, margins scabrous, apex acute. Panicles 15–30(–50) cm long, 6–12 cm wide, open, erect, terminal, elliptic, diffuse, nodding; primary panicle branches 9–18 cm long, smooth or scaberulous. Spikelets 14–30 mm long, pendulous, lanceolate, laterally compressed, breaking up at maturity; lower lemma 1.2–2 cm long, awns 30–60 mm long, geniculate, column twisted. Habitat: weed in cultivated areas. Distribution: (Mm, Ms, S) S Europe and N Africa.

KEY TO THE SUBSPECIES

1a. Spikelets (1.8–)2–3 cm long; lower lemma 1.6–2 cm long . . . . . ***A. barbata* subsp. *barbata***
1b. Spikelets 1.4–1.8 cm long; lower lemma 1.2–1.4 cm long . . . . . ***A. barbata* subsp. *wiestii* (Steud.) Mansf., Kulturpflanze, Beih. 2: 479. 1959**

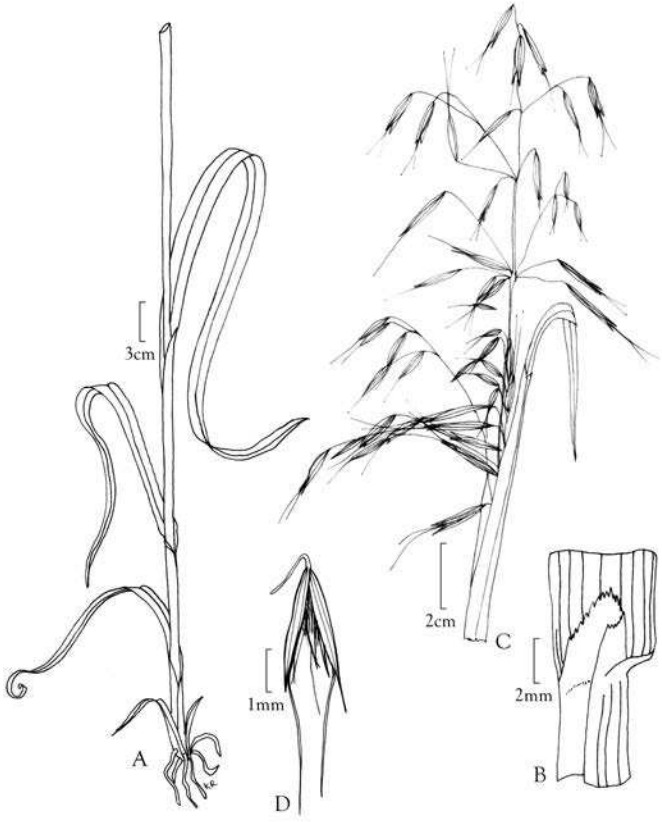


FIGURE 29. *Avena barbata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from G. *Täckholm s.n.* (CAI); B–D drawn from *G. Schweinfurth 1684* (US-805908).

21. *Avena fatua* L.

FIGURE 30

Avena fatua L., Sp. Pl., ed. 1: 80. 1753.
Common names: *khafour, zommeir*; black oat.

Caespitose annuals. Culms 30–125 cm tall, erect; nodes dark, internodes glossy; butt sheaths glabrous. Leaves mostly cauline; sheaths open, hairy, margins sparsely hairy, membranous; oral hairs present; ligules 4–6 mm long, membranous, apex erose, lacerate; blades 5–30 cm long, 4–15 mm wide, linear, flat, spreading or reflexed, scaberulous, margins scabrous, apex acute. Panicles 10–40 cm long, 5–20 cm wide, erect, terminal, pyramidal, nodding; primary panicle branches drooping, scaberulous. Spikelets 18–28 mm long, cuneate, laterally compressed; lower lemma 1.4–2.2 cm long, awns 2.5–4 cm long, geniculate, column twisted. Habitat: weed in cultivated areas. Distribution: (Mm, Ms, Nv, Nn, Dl, Ol, S) temperate Old World.

22. *Avena longiglumis* Durieu

FIGURE 31

Avena longiglumis Durieu, Rev. Bot. Bull. Mens. 1: 359. 1845.

Caespitose annuals. Culms 30–100 cm tall, erect; internodes glossy; butt sheaths glabrous. Leaves mostly basal; sheaths pubescent, margins smooth; ligules 0.5–1 mm long, membranous, apex lacerate; blades 5–30 cm long, 5–20 mm wide, linear, flat, spreading, scabrous, apex acute. Panicles 10–15 cm long, erect, terminal, open, linear, equilateral or nodding. Spikelets 25–40 mm long, lanceolate, laterally compressed; lemma awns 4–6 cm long, geniculate, column twisted. Habitat: weed in

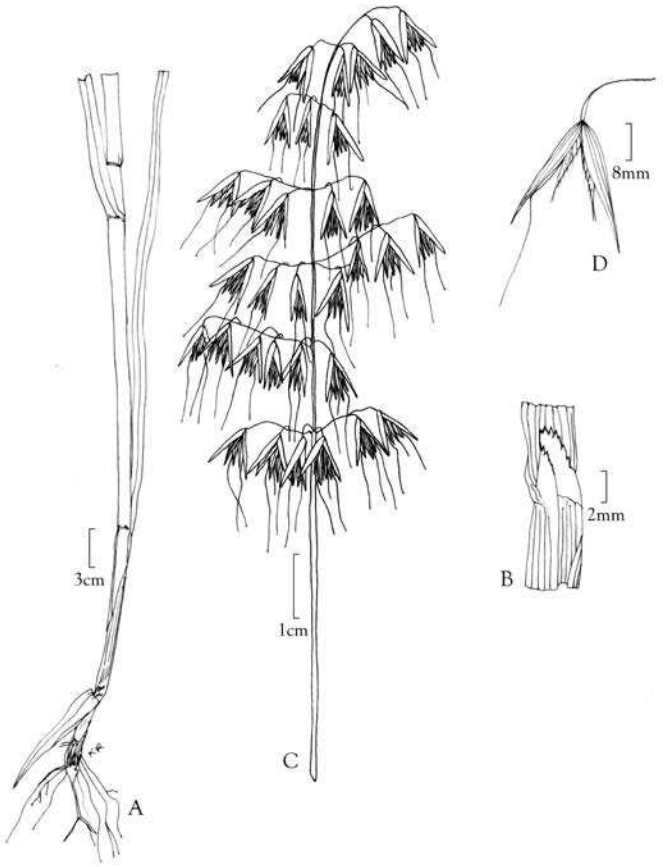


FIGURE 30. *Avena fatua.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, D drawn from *T. Cope, A. Gamal, I. El Garf s.n.* (CAI); B drawn from *A. Archer 8643* (US-2236308); C modified from Cope (2005).

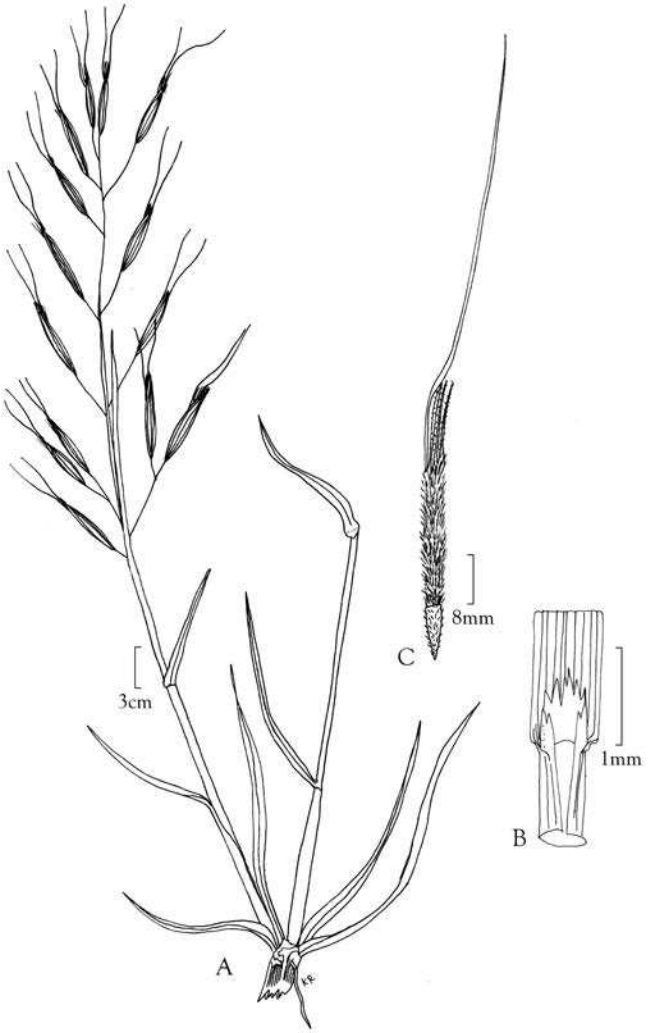


FIGURE 31. *Avena longiglumis.* A. Habit. B. Ligule, sheath, and blade. C. Floret. A–C drawn from *Balansa s.n.* (US-1126246).

cultivated areas and coastal sands. Distribution: (Mm) Mediterranean region.

23. *Avena sativa** L. subsp. *sativa*

FIGURE 32

*Avena sativa** L., Sp. Pl. 1: 79. 1753.
Common names: *shoufan*; oats, strawoats.

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

24. *Avena sterilis* L.

FIGURE 33

Avena sterilis L., Sp. Pl., ed. 2, 1: 118. 1762.
Common names: *khafour, zommeir*; animated oat.

Caespitose annuals. Culms 3–150 cm tall, erect, geniculate; nodes dark; internodes glossy; butt sheaths pubescent. Leaves

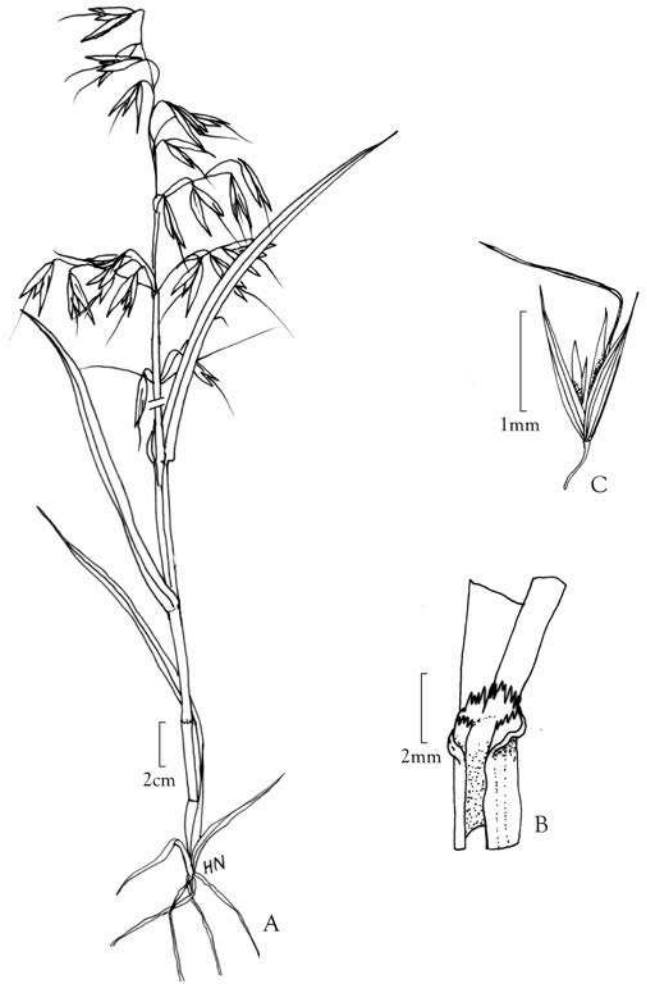


FIGURE 32. *Avena sativa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *L. F. Ward s.n.* (US-156655); C modified from Baum (2007).

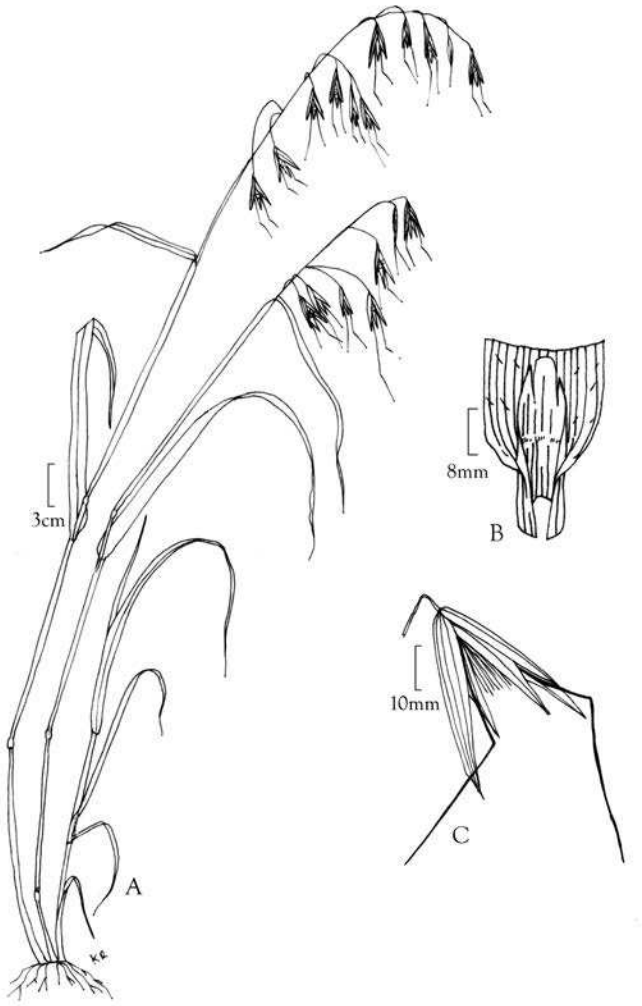


FIGURE 33. *Avena sterilis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *L. Boulos s.n.* (CAI), Ibrahim and Kabuye (1988); B drawn from *D. Fairchild s.n.* (US-1259904), *H. I. Perraudiere s.n.* (US-869913).

mostly basal; sheaths sparsely hairy, margins membranous; oral hairs present; ligules 6–8 mm long, membranous, apex truncate; blades 10–15 cm long, 2–4 mm wide, linear, flat, spreading, scaberulous, margins scaberulous, apex acute. Panicles 10–45 cm long, 5–25 cm wide, open, pyramidal, diffuse, nodding; principal branches drooping, scaberulous. Spikelets 23–50 mm long, cuneate, laterally compressed; lemmas 1.7–4.0 cm long, awns 3–8 cm long, geniculate, column twisted. Habitat: weed in cereal fields. Distribution: (Mm, Ms, Nv, Ol, On, S) S Mediterranean to India.

KEY TO THE SUBSPECIES

1a. Spikelets 3–5 cm long; lower lemma 2.5–4 cm long . . . . . ***A. sterilis* subsp. *sterilis***

1b. Spikelets 2.5–3cm long; lower lemma 2–2.5 cm long . . . . . .
. . . . . ***A. sterilis* subsp. *ludoviciana* (Durieu) J. M. Gillett & Magne, Nouv. Fl. Franç. 532. 1873**

25. *Brachypodium distachyon** (L.) P. Beauv.

FIGURE 34

*Brachypodium distachyon** (L.) P. Beauv., Ess. Agrostogr. 101, 155, 156. 1812.
Common names: *lesseiq, sha'ir barri*; purple false brome.

Caespitose annuals; rhizomes elongated. Culms 3–30 cm tall, decumbent, weak; internodes glabrous; nodes dark, bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths striate, hairy, margins hairy; ligules 1–3 mm long, membranous, lacerate; blades 3–10 cm long, 1.5–4 mm wide, linear, flat, stiff, glaucous, ascending, pilose, margins ciliate, apex acute. Racemes 2–8(–10) cm long, spreading along central axis, erect, terminal, bilateral, bearing few fertile spikelets. Spikelets 10–30 mm long, packed broadside to rachis, bilateral, embedded in rachis, oblong, laterally compressed; lemmas 7–10 mm long, awns 8–12 mm long, straight; anthers 0.5–1 mm long. Habitat: weed in cultivated areas. Distribution: (Mm, Ms, Nv, Di, Ol, On, S, Ge) Mediterranean to C Asia.

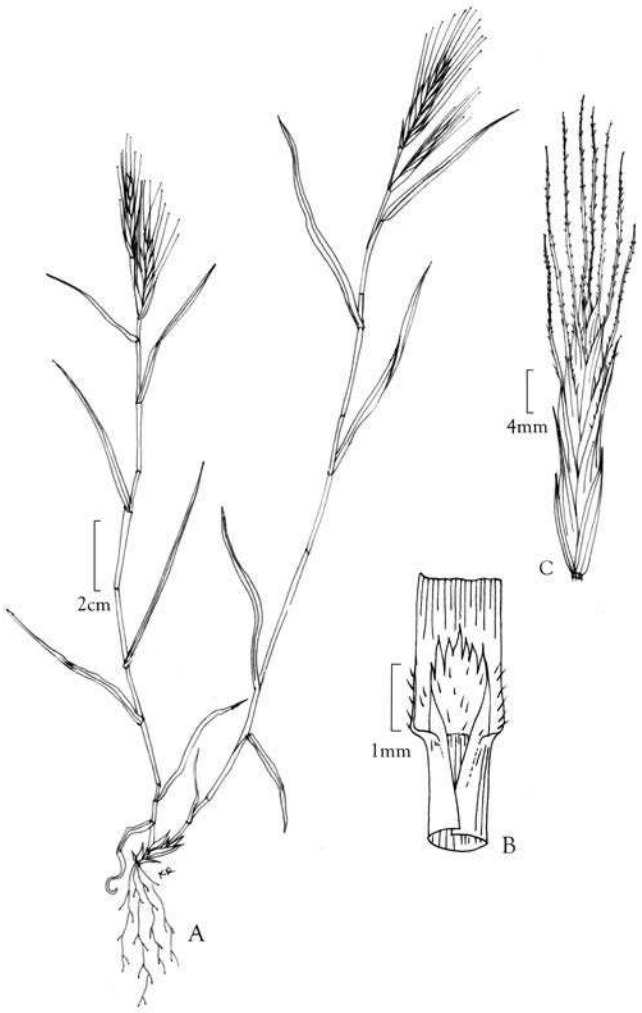


FIGURE 34. *Brachypodium distachyon.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 9592* (CAI); B, C drawn from *E. Hackel s.n.* (US-1015138).

26. *Briza maxima** L.

FIGURE 35

*Briza maxima** L., Sp. Pl. 1:70. 1753.
Common name: greater quaking grass.

Caespitose annuals. Culms 10–50 cm tall, erect; internodes glabrous, deeply striate; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; ligules 3–5 mm long, membranous, apex dentate; blades 5–20 cm long, 3–10 mm wide, linear, flat, ascending, scabrous, margins scabrous, apex acute. Panicles 3.5–10 cm long, open, terminal, erect, comprising 3–12 fertile spikelets. Spikelets 14–25 mm long, 8–15 mm wide,

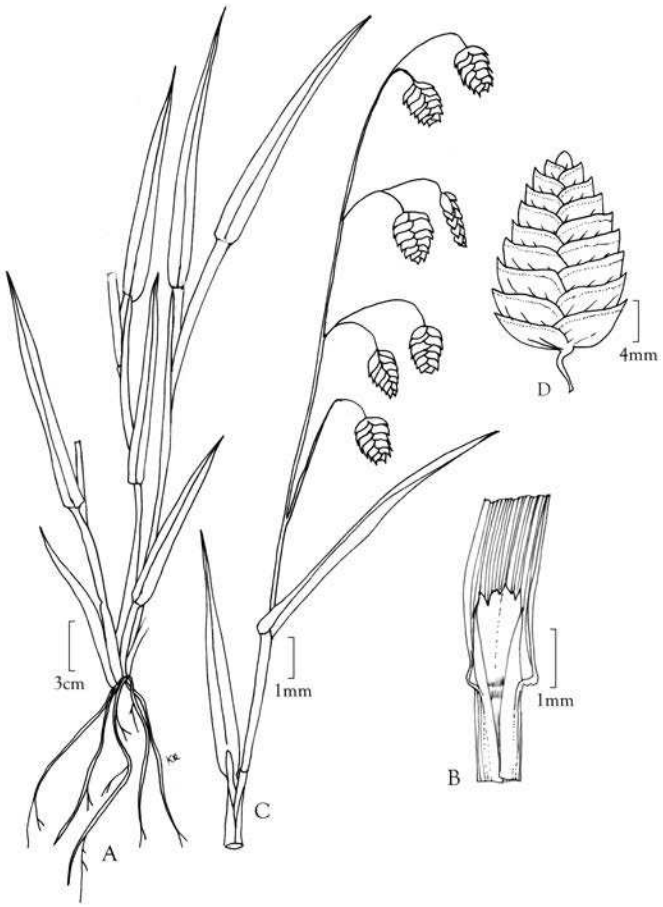


FIGURE 35. *Briza maxima.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from *L. Boulos, M. Khalifa, N. Sherif 4119* (CAI); B, D drawn from *G. Schweinfurth s.n.* (US-805956).

pendulous, oblong or ovate, laterally compressed; fertile spikelets pedicels 5–20 mm long, filiform, recurved; lemmas 7–9 mm long, awnless; anthers 1.2–1.5 mm long. Habitat: introduced. Distribution: (Nn, Nv) Mediterranean.

27. *Briza minor** L.

FIGURE 36

*Briza minor** L., Sp. Pl. 1:70. 1753.
Common name: lesser quaking grass.

Caespitose annuals. Culms 10–50 cm tall, decumbent, geniculate, glabrous, striate; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, margins membranous; ligules 3–6 mm long, membranous, apex truncate; blade 3–10 cm long, 3–6 mm wide, linear, flat, flaccid, scaberulous, margins scabrous, apex acute. Panicles 4–20 cm long, erect, open, obovate, bearing many spikelets. Spikelets 3–5 mm long, 3–5 mm wide, pendulous, ovate or orbicular, laterally compressed; fertile spikelets pedicels 5–15 mm long, filiform, recurved; lemmas 1.6–2 mm long, awnless; anthers 0.4–0.5 mm long. Habitat: weed in cultivated areas. Distribution: (Ms, Nv) Mediterranean region.

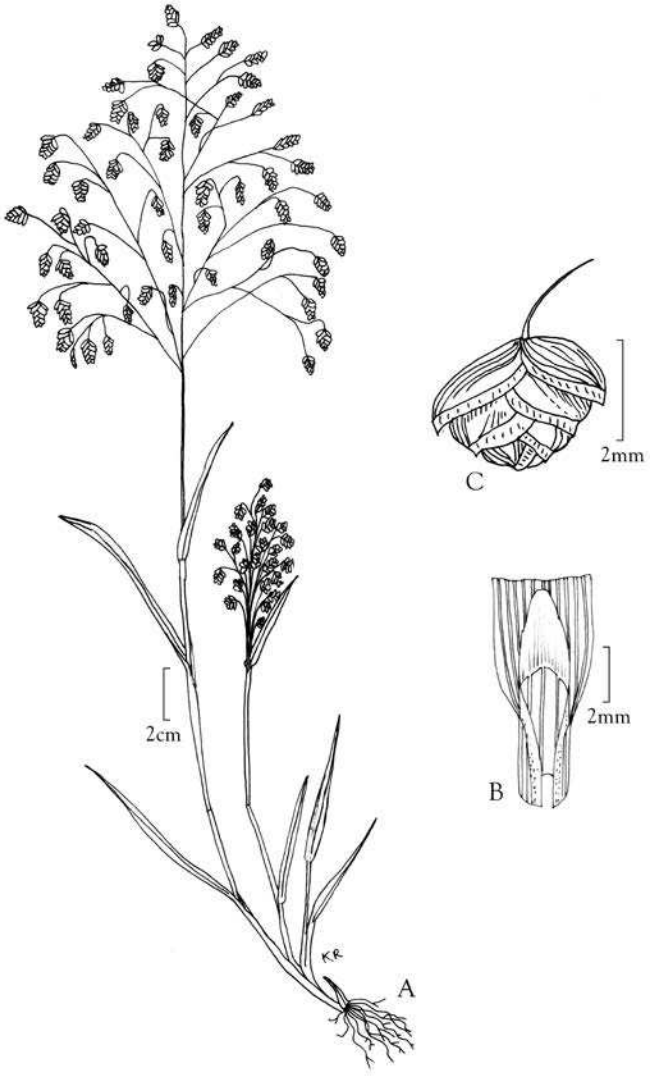


FIGURE 36. *Briza minor*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm 182* (CAI); B, C drawn from *W. R. Anderson & D. C. Sternberg 3476* (US-2563915).

28. *Bromus aegyptiacus* Tausch

FIGURE 37

Bromus aegyptiacus Tausch, Flora 20(1): 124. 1837.
Common name: *bakhragun el ghul*.

Solitary annuals. Culms 20–50 cm tall, erect, geniculate; internodes glabrous, glaucous; nodes swollen; butt sheaths

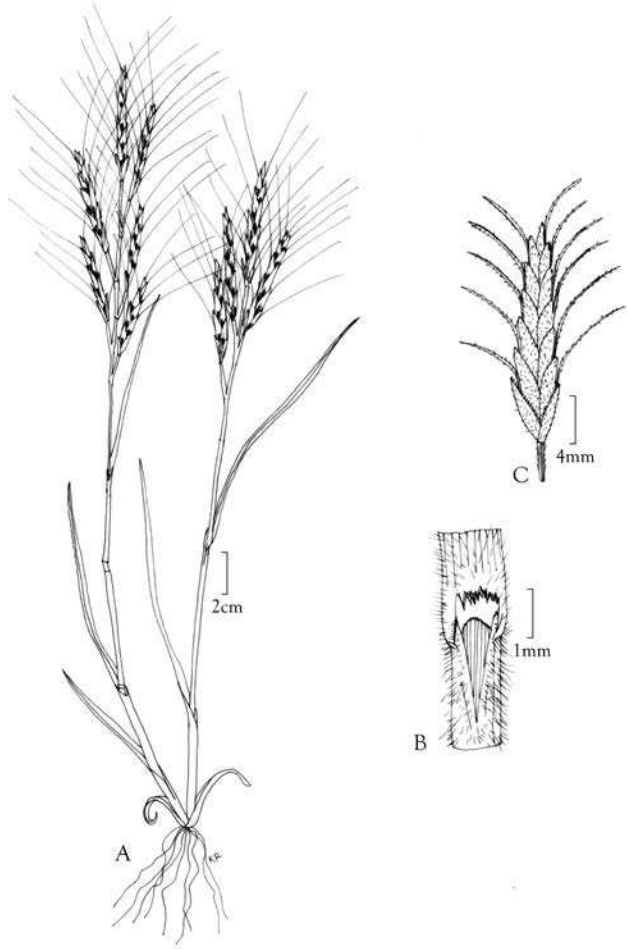


FIGURE 37. *Bromus aegyptiacus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *G. Schweinfurth 1236* (US-805951).

glabrous. Leaves basal and cauline; sheaths closed, pilose, margins ciliate; ligules 1–3 mm long, membranous, lacerate; blades 3–8 cm long, 1–3 mm wide, linear, flat, ascending, pilose, margins smooth, apex acute. Panicles 3–6 mm long, contracted, erect, terminal. Spikelets 14–20 mm long, oblong, laterally compressed; lemmas 6.5–8 mm long, awns 4–11 mm long, straight, bristly. Habitat: weed in cultivated areas. Distribution: (Nv, endemic to Egypt; Cope, 2005) SW Asia.

29. *Bromus alopecuros* Poir.

FIGURE 38

Bromus alopecuros Poir., Voy. Barbarie 2: 100. 1789.
Common name: foxtail brome.

Solitary annuals. Culms 20–50 cm tall, erect, geniculate, internodes glabrous, glaucous; butt sheaths glabrous. Leaves basal and cauline; sheaths closed, pubescent, margins hairy; ligules 1–3 mm long, membranous, apex dentate; blades 5–20 cm long, 3–5 mm wide, linear, flat, ascending, hirsute, margins entire, apex acute. Panicles 6–20 cm long, 1–3 cm wide, open, linear or oblong, erect; panicle branches stiff, appressed. Spikelets 24–45 mm long, 3–7 mm wide, lanceolate or ovate, laterally compressed; lemmas 1.1–1.8 cm long, awns 11–20 mm long, straight, bristly, coiled at the base. Habitat: location unconfirmed. Distribution: (Nv) E Mediterranean.

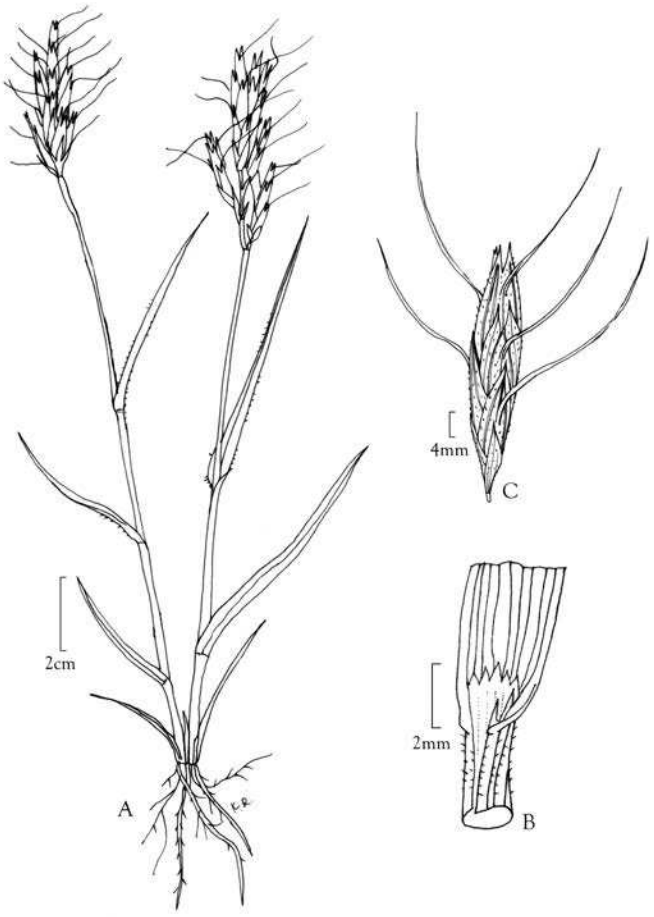


FIGURE 38. *Bromus alopecuros*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm 10* (CAI); B, C drawn from *E. Hackel s.n.* (US-1099625).

30. *Bromus catharticus** Vahl

FIGURE 39

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

Caespitose, short-lived perennials. Culms 20–70 cm tall, erect, geniculate, internodes glabrous, striate; butt sheaths sparsely hairy. Leaves basal and cauline; sheaths closed, pubescent, margins hairy; oral hairs present; ligules 1–3 mm,

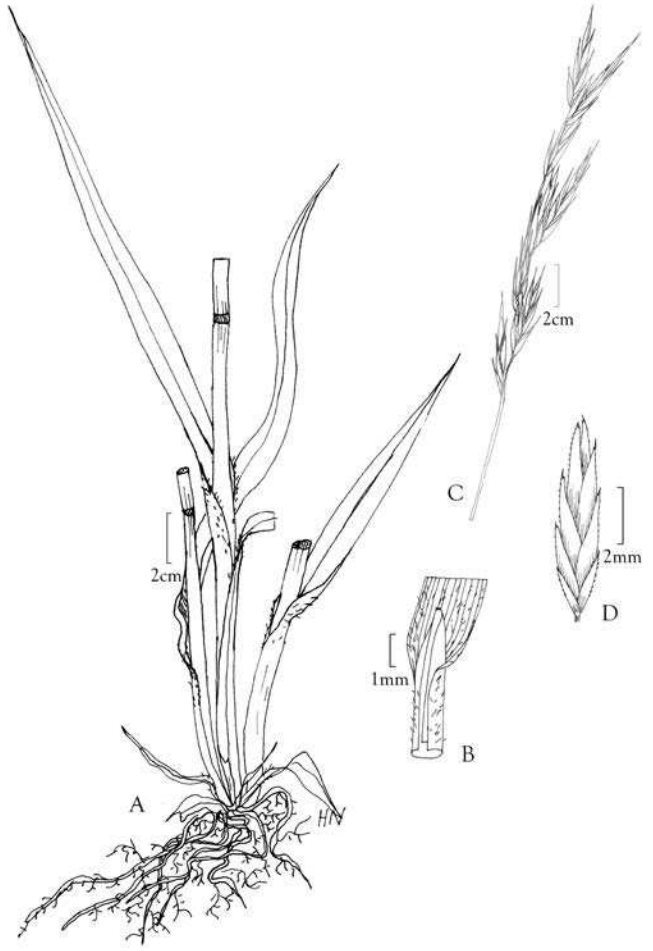


FIGURE 39. *Bromus catharticus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *R. Kanal 434* (US-3279029).

membranous, apex erose; blades 10–30 cm long, 3–5 mm wide, linear flat, flaccid, spreading, hairy, margins smooth, apex acute. Panicles 10–40 cm long, open, oblong, diffuse; branches flexuous. Spikelets 16–40 mm long, 4–10 mm wide, ovate, laterally compressed, compressed strongly; lemmas 1.5–2 cm long, apex mucronate or awned, the awns 1–4(–9) mm long, straight, bristly. Habitat: cultivated areas and disturbed sites. Distribution: (Mm, Ms, Nv, Di, O) introduced from the New World.

31. *Bromus danthoniae* Trin. ex C. A. Mey.

FIGURE 40

Bromus danthoniae Trin. ex C. A. Mey., Verz. Pfl. Casp. Meer. 24. 1831.

Caespitose annuals. Culms 5–50 cm tall, erect, geniculate; internodes hispid; butt sheaths pubescent. Leaves basal and cauline; sheaths closed, tubular for most of their length, hairy, margins sparsely hairy; oral hairs present; ligules 1–3 mm long, membranous, apex dentate, lacerate; blades 2–8 cm long, 2–4 mm wide, linear, flat, ascending, sparsely hairy or pubescent, margins cartilaginous, bases broad, apex acute. Panicles 2–10 cm long, 1–2 cm wide, open, ovate, dense; primary panicle branches simple scabrous. Spikelets 10–40 mm long, 4–10 mm wide, elliptic, laterally compressed; lemmas 0.8–1.2 cm long, 3-awned, the central awns 5–15 mm long, spreading, bristly, geniculate. Habitat: rocky slopes. Distribution: (S) E Mediterranean eastward to India.

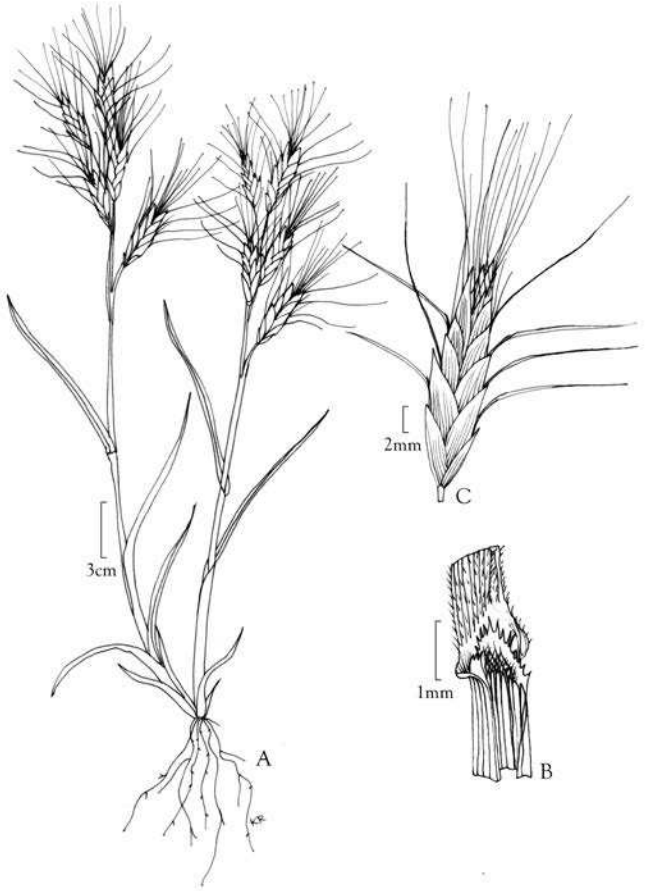


FIGURE 40. *Bromus danthoniae.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Dahok s.n.* (CAI); B, C drawn from *J. B. Gillet s.n.* (US-2209433), *D. V. Mono s.n.* (US-1009828).

32. *Bromus diandrus* Roth

FIGURE 41

Bromus diandrus Roth, Bot. Abh. Beobacht. 44. 1787.

Common names: great brome, longarm ripgut brome, ripgut brome.

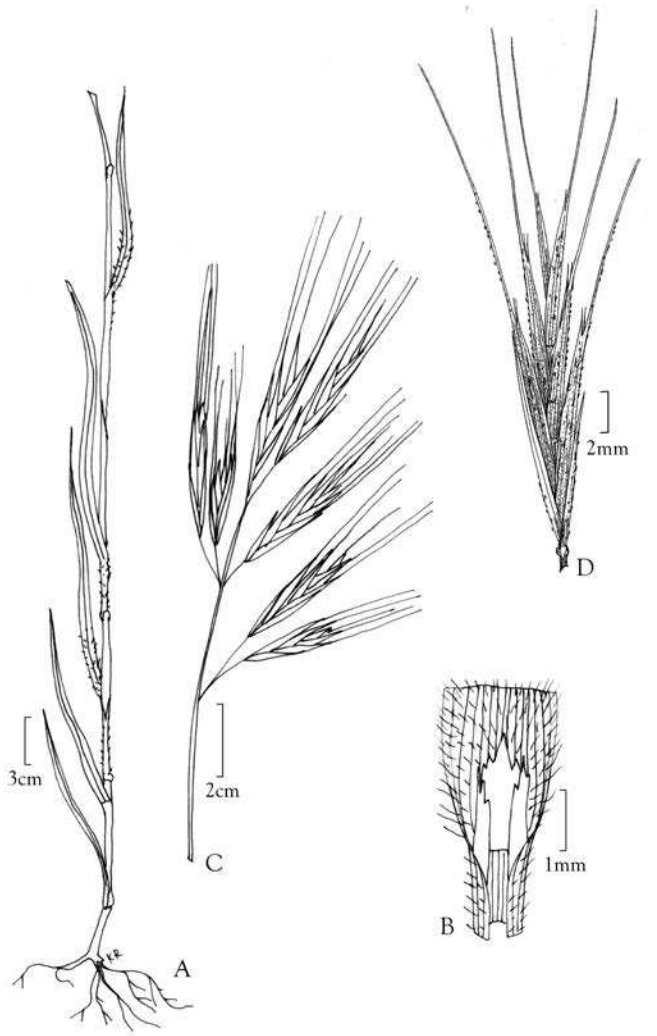


FIGURE 41. *Bromus diandrus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm, L. Boulos & M. Zahran s.n.* (CAI); B–D drawn from *D. V. Monro s.n.* (US-1009828).

Caespitose annuals. Culms 20–100 cm tall, erect, geniculate; internodes glabrous, striate, glossy; butt sheaths sparsely hairy. Leaves mostly basal; sheaths closed, hairy, margins membranous, hairy; oral hairs present; ligules 1–3 mm long, membranous, apex lacerate; blades 3–15 cm long, 1–5 mm wide, linear, flat, ascending, pilose and/or scaberulous, margins smooth, apex acute. Panicles 10–25 cm long, open, ovate, diffuse, nodding; primary panicle branches 3–10 cm long with 2–4 drooping branches, simple, bearing 1(–2) fertile spikelets on each lower branch, flexuous, scabrous. Spikelets (20–)45–60 mm long, cuneate, laterally compressed; lemmas 2.4–3.5 cm long, awns 35–75 mm long, straight, bristly. Habitat: cultivated fields. Distribution: (Mm, Ms, Nv, Nn, Di, Ol) C and S Europe, N Africa, and SW Asia.

KEY TO THE VARIETIES

1a. Panicle lax, spreading, broadly ovate, the branches longer than spikelets; base of lemma in profile, contracted just above the callus; callus blunt with an oval scar . . . . . ***B. diandrus* var. *diandrus***

1b. Panicle contracted, stiffly erect, narrowly ovate, the branches usually shorter than the spikelets; base of lemma in profile, continuous with callus; callus pointed with an elliptic scar . . . . . ***B. diandrus* var. *rigidus* (Roth) Sales, Edinb. J. Bot. 50: 9. 1993**

33. *Bromus fasciculatus* C. Presl

FIGURE 42

Bromus fasciculatus C. Presl, Cyper. Gramin. Sicul. 39. 1820.
Common names: *abu fakhour, sabal abu el-hosein, safsouf*.

Caespitose annuals. Culms 5–10 cm tall, erect, geniculate, surfaces hirsute; butt sheaths sparsely hairy. Leaves basal and cauline; sheaths closed, pubescent, margins smooth; oral hairs present; ligules 3–6 mm long, membranous, apex lacerate, blades 2–8 cm long, 1–1.5 mm wide, linear-filiform, flaccid, spreading, sparsely hairy, margins scabrous, apex acuminate. Panicles 2–6 cm long, 0.7–2 cm wide, obovate, contracted, erect; primary branches bearing 1(–2) fertile spikelets on each lower branch, pubescent. Spikelets 10–20 mm long, 5–12 mm wide, cuneate, laterally compressed; lemmas 1.1–1.5 cm long, awns 10–18 mm long, straight, bristly. Habitat: sandy and rocky slopes. Distribution: (Mm, Ms, Nv, Di, Ra, Ge) Mediterranean and SW Asia.

34. *Bromus hordeaceus* L.

FIGURE 43

Bromus hordeaceus L., Sp. Pl. 1: 77. 1753.
Common name: soft brome.

Caespitose annuals; butt sheaths pubescent. Culms 20–50 cm tall, erect, internodes glabrous, striate; nodes bearded; butt sheaths pubescent. Leaves basal and cauline; sheaths closed, scabrous, margins sparsely hairy; oral hairs present; ligules 1–3 mm long, membranous, apex erose; blades 3–10 cm long, 2–4 mm wide, linear, flat, ascending, hirsute or sparsely hairy, margins scabrous, apex acuminate. Panicles 1.5–16 cm long, 0.5–6 cm wide, open, erect, ovate, equilateral or nodding; primary panicle branches bearing 1–7(–14) fertile spikelets on each lower branch, the branches pubescent. Spikelets 12–22 mm long,

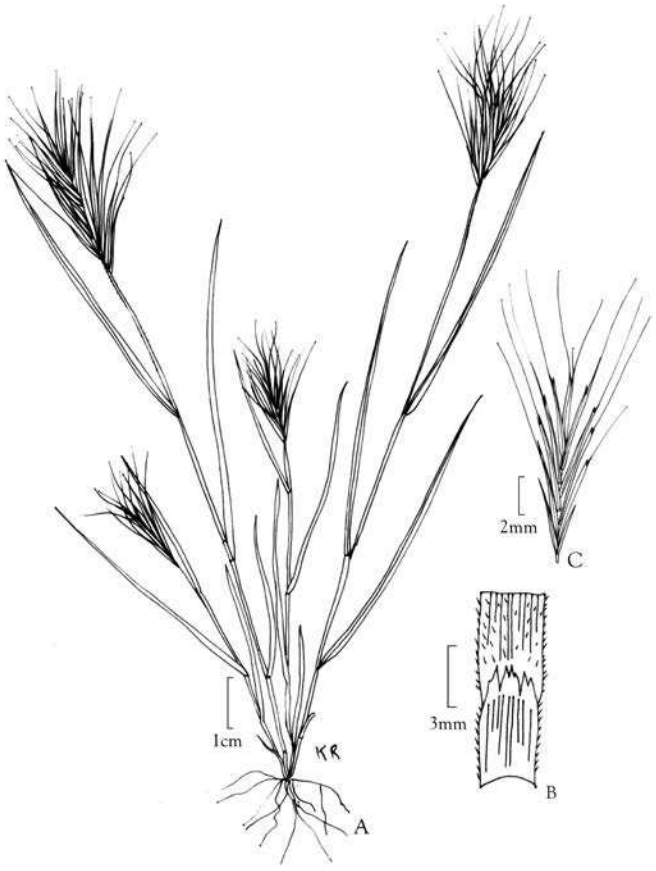


FIGURE 42. *Bromus fasciculatus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby & M. Zahran 1973* (CAI); B, C drawn from *G. Schweinfurth* (US-805952).

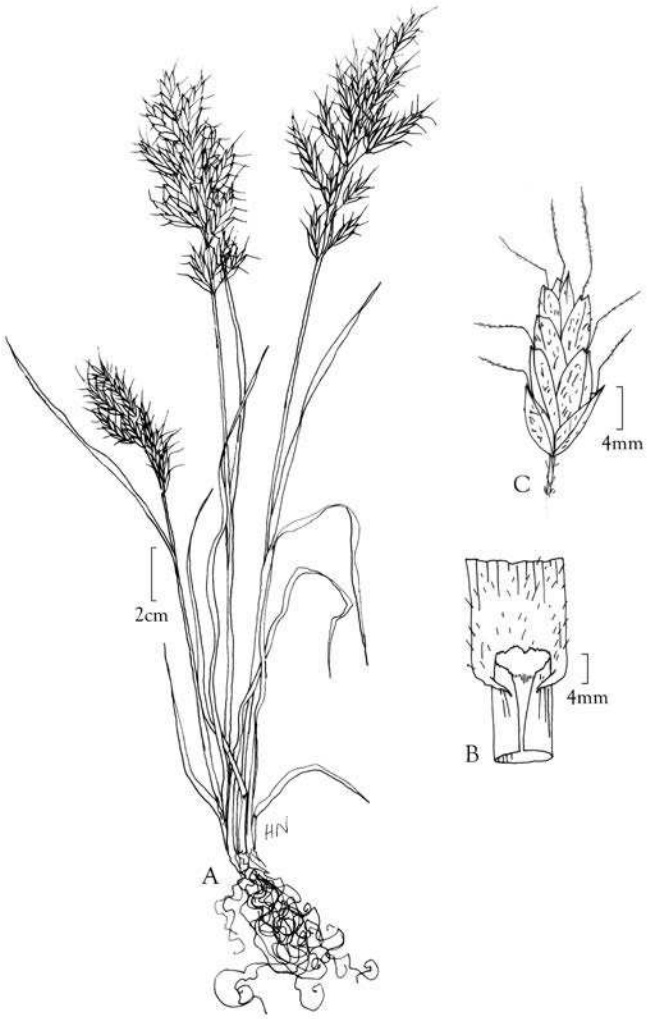


FIGURE 43. *Bromus hordeaceus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *S. F. Blake s.n.* (US-1646029); C modified from Pavlick and Anderton (2007).

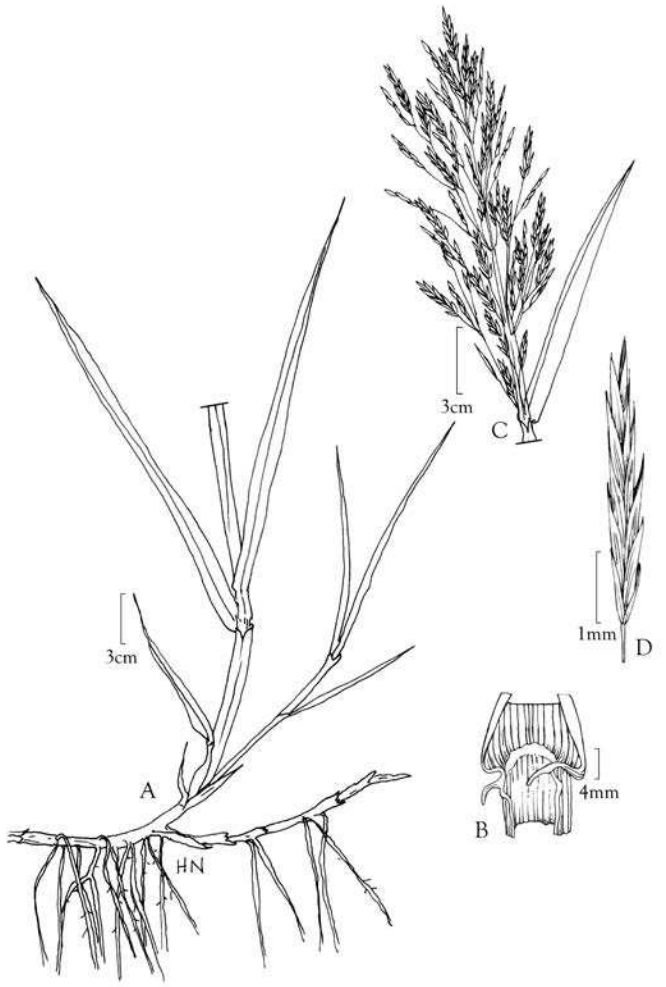


FIGURE 44. *Bromus inermis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *R. Kanal 148* (US-3117677); D modified from Pavlick and Anderton (2007).

3.5–6(–8) mm wide, ovate, laterally compressed; lemmas 0.7–1.2 cm long, awns 5–10 mm long, geniculate, bristly. Habitat: waste places. Distribution: (Nv) Europe, W Asia, introduced into N and S America, Australia, and temperate regions.

35. *Bromus inermis** Leyss.

FIGURE 44

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

Caespitose or solitary perennials; rhizomes short. Culms 20–30 cm tall, erect; internodes pubescent, striate; butt sheaths glabrous with dead fibrous leaf sheaths. Leaves basal and cauline; sheaths closed, glabrous, margins smooth; ligules 1–3 mm long, membranous, apex erose; blades 2–8 cm long, 2–4 mm wide, linear, flat, flaccid, spreading, glabrous or scaberulous, margins smooth, apex acuminate. Panicles 10–15 cm long, 4–10 cm wide, open or contracted, ovate, dense, equilateral or nodding; 3–4 primary panicle branches, each bearing 1–2 fertile spikelets. Spikelets 15–25 mm long, 3–5 mm wide, oblong, laterally compressed; lemmas 1–1.3 cm long, awnless, mucronate or with a short awn up to 1.5 mm long. Habitat: Introduced as an agricultural weed. Distribution: (Nv) Europe and temperate Asia.

36. *Bromus japonicus** Houtt.

FIGURE 45

*Bromus japonicus** Houtt., Nat. Hist. 2(13): 315, t. 91, f. 4. Aanwyzing Pl. [2]. 1782.
Common names: *fakhour, safsouf*; Japanese brome, Japanese chess.

Caespitose annuals. Culms 20–70 cm tall, erect, geniculate, glabrous; butt sheaths pubescent. Leaves basal and cauline; sheaths closed, hairy, margins ciliate, membranous; oral hairs present; ligules 1–3 mm long, membranous, apex erose; blades 6–10 cm long, 1–3 mm wide, linear, conduplicate, spreading, glabrous or pubescent, margins scabrous, apex acuminate. Panicles 10–20 cm long, 5–10 cm wide, open, ovate, diffuse; primary panicle branches spreading, drooping, multilateral or secund, scabrous. Spikelets 15–35(–40) mm long, ovate, laterally compressed; lemmas 0.8–1.2 cm long, awns 5–10 mm long, straight, bristly. Habitat: waste places. Distribution: (Mm) C Europe to Japan, introduced.

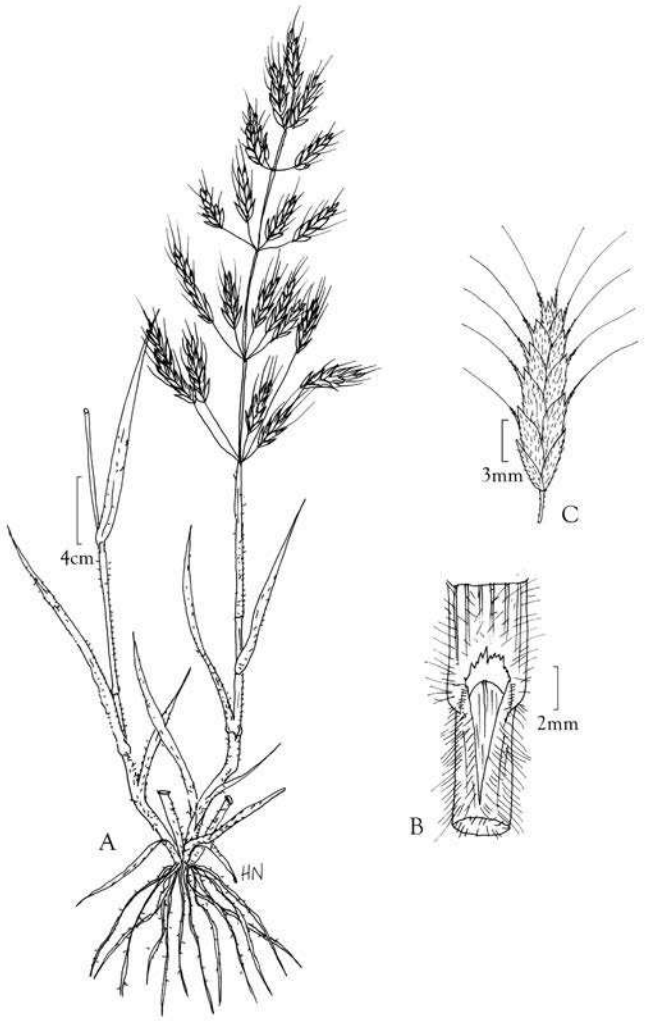


FIGURE 45. *Bromus japonicus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *H. A. Allard 630* (US-1678979).

37. *Bromus lanceolatus* Roth

FIGURE 46

Bromus lanceolatus Roth, Catal. Bot. 1: 18. 1797.
Common name: Mediterranean brome.

Caespitose annuals. Culms 10–80 cm tall, erect, geniculate; internodes glabrous, striate; nodes bearded; butt sheaths woolly. Leaves basal and cauline; sheaths closed, woolly, margins membranous, surfaces hairy; oral hairs ciliate; ligules 1–3 mm long,

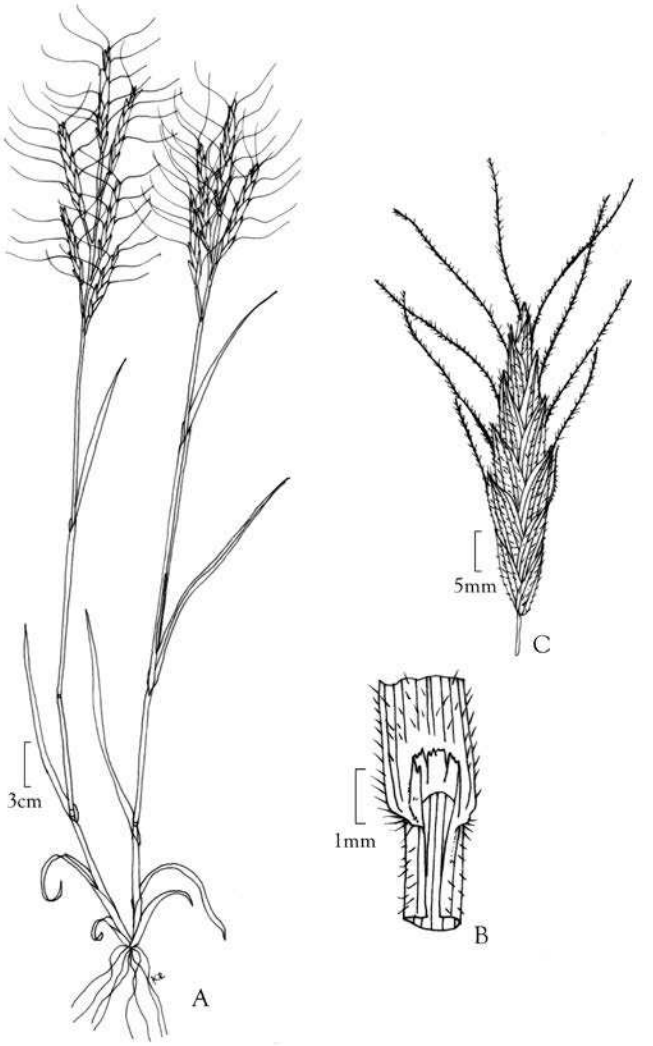


FIGURE 46. *Bromus lanceolatus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos 3062* (CAI); B, C drawn from *F. Wrigley 65/1274* (US-2640022).

membranous, apex lacerate; blades 10–12 cm long, 1–2.5 mm wide, linear, flat, flaccid, spreading, glabrous or pubescent, margins hairy, apex acuminate. Panicles (2–)6–12(–20) cm long, 2–8 cm wide, lanceolate or ovate; primary panicle branches ascending or spreading. Spikelets (12–)25–50 mm long, 6–16 mm wide, lanceolate or oblong, laterally compressed; lemmas 1.1–1.4 cm long, awns 6–12 mm long, straight, bristly. Habitat: rocky slopes and waste places. Distribution: (Nv) Europe, Mediterranean eastward to C Asia.

38. *Bromus lepidus** Holmb.

FIGURE 47

*Bromus lepidus** Holmb., Bot. Not. 1924: 326. 1924.
Common name: slender soft brome.

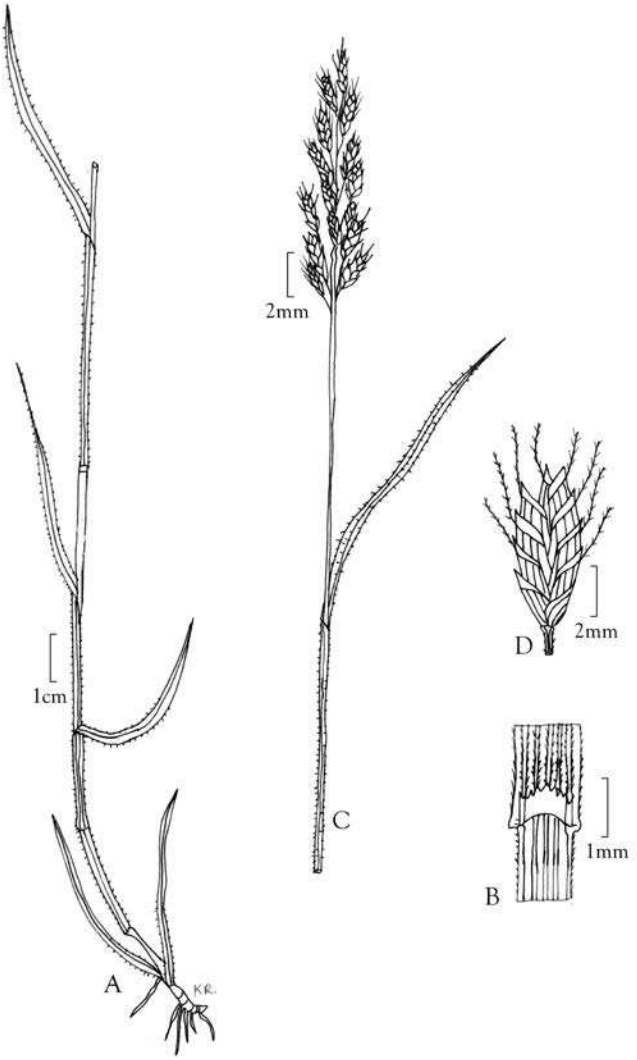


FIGURE 47. *Bromus lepidus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *M. Hassib s.n.* (CAI); B–D drawn from *R. Olsen s.n.* (US-1816226).

Caespitose annuals; rhizomes short. Culms 20–35 cm tall, erect; internodes pubescent, striate; butt sheaths glabrous. Leaves basal and cauline; sheaths closed, sparsely hairy, margins hairy; oral hairs present; ligules 1–3 mm long, membranous, apex erose; blades 6–12 cm long, 1–2 mm wide, linear, flat, flaccid, spreading, pubescent, margins smooth, apex acute. Panicles 2–10 cm long, 1–4 cm wide, open or contracted, lanceolate, equilateral or nodding; primary branches 2–4 cm long, bearing 1–3 fertile spikelets on each lower branch, branches pubescent. Spikelets 7–15 mm long, 2.5–5 mm wide, lanceolate or ovate, laterally compressed; lemmas 5–6.5 mm long, awns 3–7 mm long, straight. Habitat: cultivated areas. Distribution: (Nv) Europe, cultivated.

39. *Bromus madritensis* L.

FIGURE 48

Bromus madritensis L., Cent. Pl. I 5. 1755.
Common names: *abu keneitla, deil el taalab*; foxtail chess.

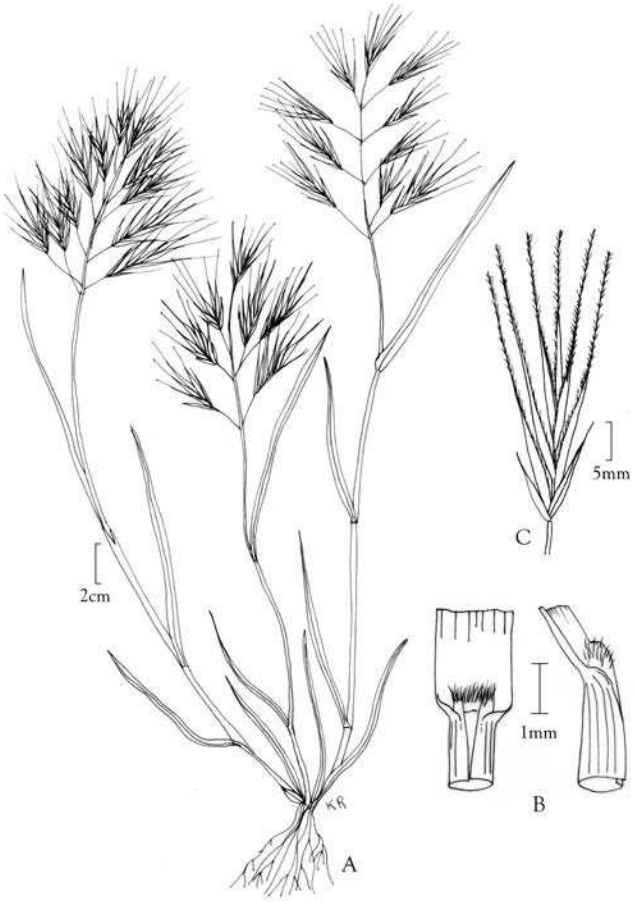


FIGURE 48. *Bromus madritensis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *M. Hassib s.n.* (CAI); B, C drawn from *H. Thompson s.n.* (US-1646850).

Caespitose annuals. Culms 10–60 cm tall, erect, geniculate; internodes glabrous, straw colored; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blades, hairy, closed, margins smooth; ligules 1–3 mm long, membranous, apex lacerate; blades 3–15 cm long, 1.5–3 mm wide, linear, flat, flaccid, spreading, glabrous or pubescent, margins smooth, apex acute. Panicles 4–15 cm long, 1.5–6 cm wide, erect, contracted, ovate; primary panicle branches 0.5–3.5 cm long, ascending bearing 1–3 fertile spikelets on each lower branch, branches straight, scabridulous. Spikelets 20–45 mm long, cuneate, laterally compressed; lemmas 1.3–2 cm long, awns 12–20 mm long, straight, bristly. Habitat: sandy soils and cultivated areas. Distribution: (Mm, Ms, S) S Mediterranean to SW Asia.

40. *Bromus pectinatus* Thunb.

FIGURE 49

Bromus pectinatus Thunb., Prodr. Fl. Cap. 1: 22. 1794.
Common names*: safsouf, yadaab*.

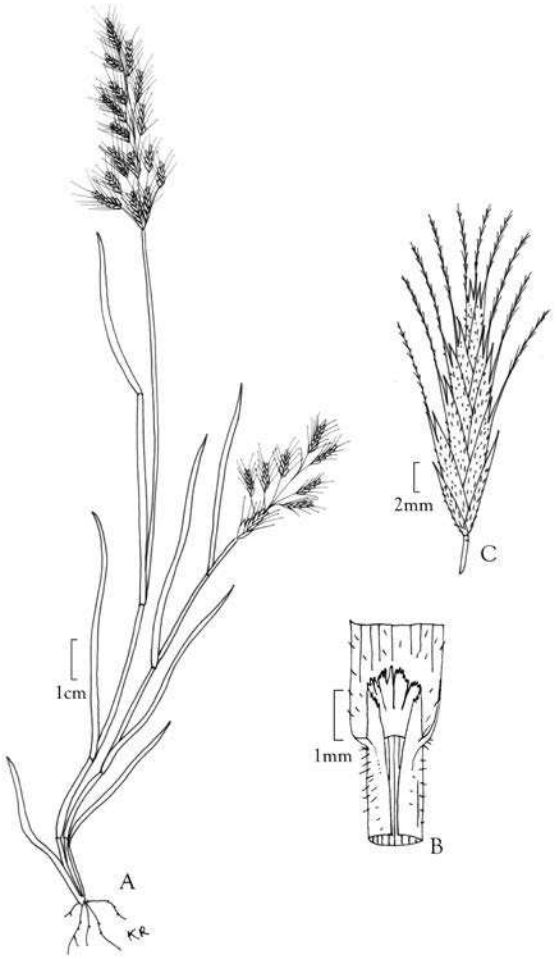


FIGURE 49. *Bromus pectinatus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *M. Mahdi 2248* (CAI); B, C drawn from *N. Parmanand 513* (US-1983379).

Caespitose annuals. Culms 10–30 cm tall, erect, geniculate, weak; internodes pubescent, striate; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy, closed at least near base, margins hairy; oral hairs present; ligules 1.5–3 mm long, membranous, apex lacerate; blades 4–10 cm long, 1–2.5 mm wide, linear, flat, flaccid and spreading, pubescent, margins smooth, apex acute. Panicles 5–25 cm long, erect, oblong; primary panicle branches drooping, scabrous. Spikelets 13–30 mm long, oblong or cuneate, laterally compressed; lemmas 0.75–1.5 cm long, awns 9–17 mm long, straight, bristly. Habitat: sandy and rocky slopes. Distribution: (Di, S, Ra, Ge) tropical, southern Africa to Europe and E Asia.

41. *Bromus pulchellus* Eig & De Not.

FIGURE 50

Bromus pulchellus Eig & De Not., Mem. Reale Accad. Sci. Torino, ser. 2, 12: 260. 1852.

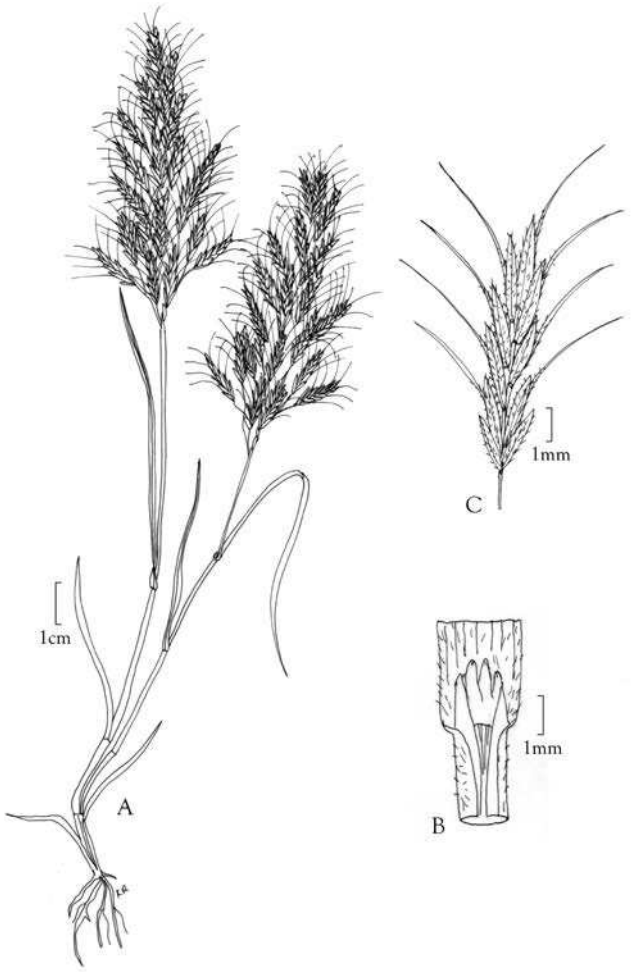


FIGURE 50. *Bromus pulchellus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *J. R. Shabetai s.n.* (K-H2011/01927).

Caespitose annuals. Culms 10–25 cm tall, geniculate, weak; internodes glabrous; butt sheaths sparsely hairy. Leaves basal and cauline; sheaths closed, glabrous, margins smooth; oral hairs present; ligules 3–6 mm long, membranous, apex lacerate, dentate; blades 2–8 cm long, 1–1.5 mm, linear-filiform, flaccid, spreading, pilose, apex acuminate. Panicles 5–25 cm long, open, erect, terminal. Spikelets 13–30 mm long; lemmas 0.75–1.5 cm long, awns 7–17 mm long, reflexed, bristly. Habitat: sandy and gravelly areas. Distribution: (Di) Iran, Pakistan, and C Asia.

42. *Bromus pumilio* (Trin.) P. M. Sm.

FIGURE 51

Bromus pumilio (Trin.) P. M. Sm., Feddes Repert. 79: 338. 1969.
[*Boissiera squarrosa* (Banks & Sol.) Nevski.]
Common names: *el-ehaim, fakhour*.

Caespitose annuals. Culms 5–15 cm tall, erect, scabrous; butt sheaths pubescent. Leaves mostly cauline; sheaths sparsely hairy, upper portion tubular for much of their length, margins scabrous; oral hairs present; ligules 1–3 mm long, membranous, apex lacerate, dentate; blades 2–8 cm long, 1–1.5 mm wide, linear, flat or involute, flaccid, pubescent, margins scabrous, apex acute. Panicles 2–7 cm long, 2–3.5 cm wide, compact, erect, terminal, ovoid. Spikelets 10–17 mm long, lanceolate, laterally compressed; 5–9-awned; lemmas 10.5–13 mm long, awns 6–14 mm long. Habitat: sandy and stony soils. Distribution: (Nv, Dg, S) Mediterranean to C Asia.

43. *Bromus rubens* L.

FIGURE 52

Bromus rubens L., Cent. Pl. I 5. 1755.
Common names: *abu keneitla, abu shtert, deil el ta'leb*; red brome.

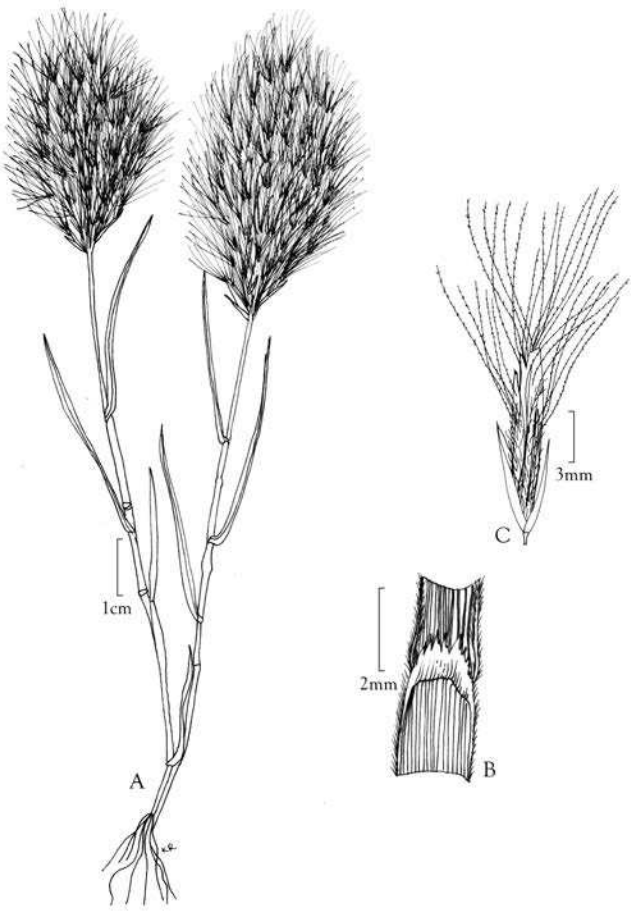


FIGURE 51. *Bromus pumilio*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *V. Täckholm, M. Kassas, N. Haddidi s.n.* (CAI); B drawn from *K. H. Rechinger 31276* (US-2637440).

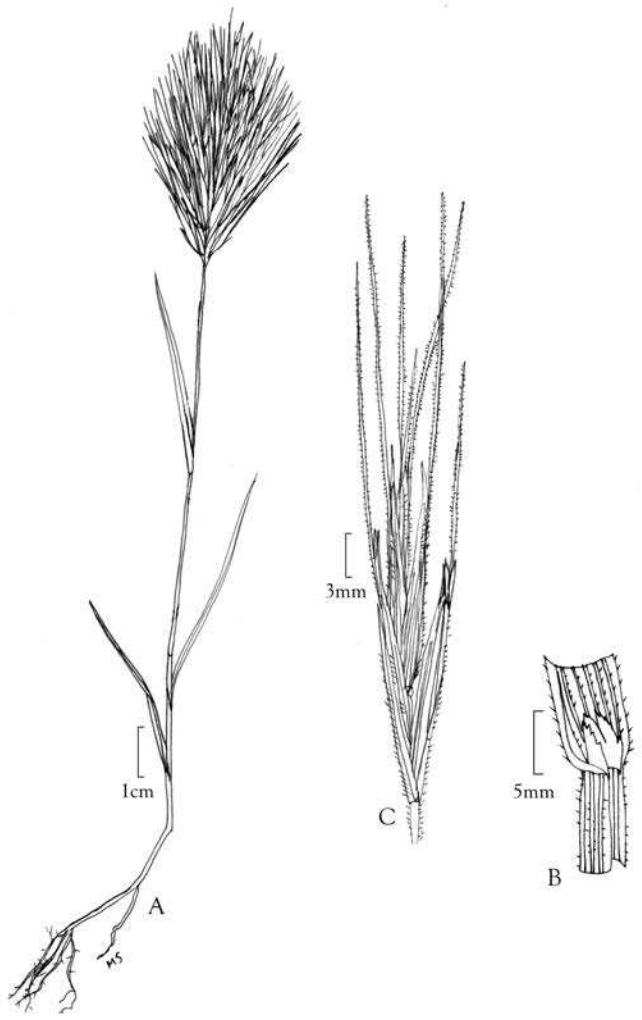


FIGURE 52. *Bromus rubens*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Oliver s.n.* (CAI); B, C drawn from *J. Bornmuller 5662* (US-1127902).

Caespitose annuals. Culms 10–25 cm tall, erect, geniculate; internodes glabrous; butt sheaths woolly. Leaves basal and cauline; sheaths closed, pubescent to pilose, margins scabrous; ligules 3–6 mm long, membranous, apex lacerate; blades 2.5–5 cm long,1.5–2.5 mm wide, linear, conduplicate, ascending, hirsute, margins scabrous, apex acuminate. Panicles 5–10 cm long, 2–5 cm wide, erect, dense, spiciform, obovate; panicle branches pubescent, fertile spikelets pediceled. Spikelets 15–30 mm long, 2–6 mm wide, cuneate, laterally compressed; lemmas 1–1.5 cm long, awns 7–23 mm long, straight, bristly. Habitat: sandy areas. Distribution: (Mm, Ms, Nv, Ol) Mediterranean and SW Asia.

44. *Bromus scoparius* L.

FIGURE 53

Bromus scoparius L., Cent. Pl. I 6. 1755.
Common name: broom brome.

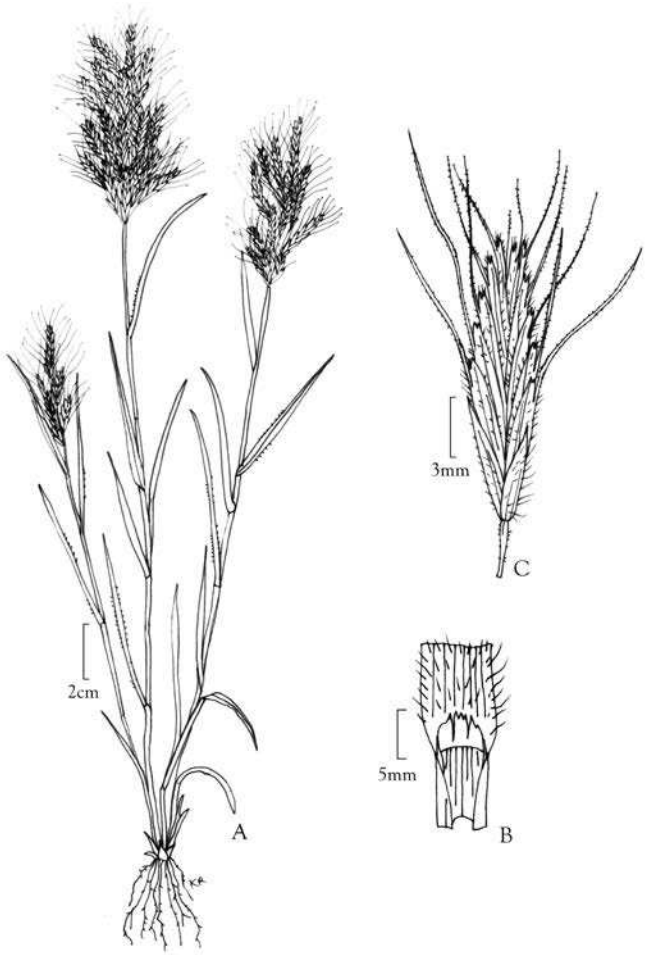


FIGURE 53. *Bromus scoparius.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm s.n* (CAI); B, C drawn from *E. Hackel s.n.* (US-1009935).

Caespitose annuals. Culms 10–40 cm tall, erect, geniculate; internodes glabrous, straw colored; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths closed, hairy, margins smooth; oral hairs present; ligules 1–3 mm long, membranous, apex lacerate; blades 6–15 cm long, 1.5–2.5 mm wide, linear-filiform, flaccid, spreading, pilose, margins sparsely hairy, apex acuminate. Panicles 1–7 cm long, 0.5–3 cm wide, ellipsoid, open or contracted, oblong or obovate, dense; primary panicle branches 0.3–0.4 cm long. Spikelets 10–15 mm long, 2–3 mm wide, oblong or ovate, laterally compressed; lemmas 0.6–1.1 cm long, awns 4–10 mm long, straight or recurved, bristly. Habitat: weed in cultivated areas. Distribution: (Mm, Ms, Nv, Di) Mediterranean region to NW India.

45. *Bromus sterilis** L.

FIGURE 54

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

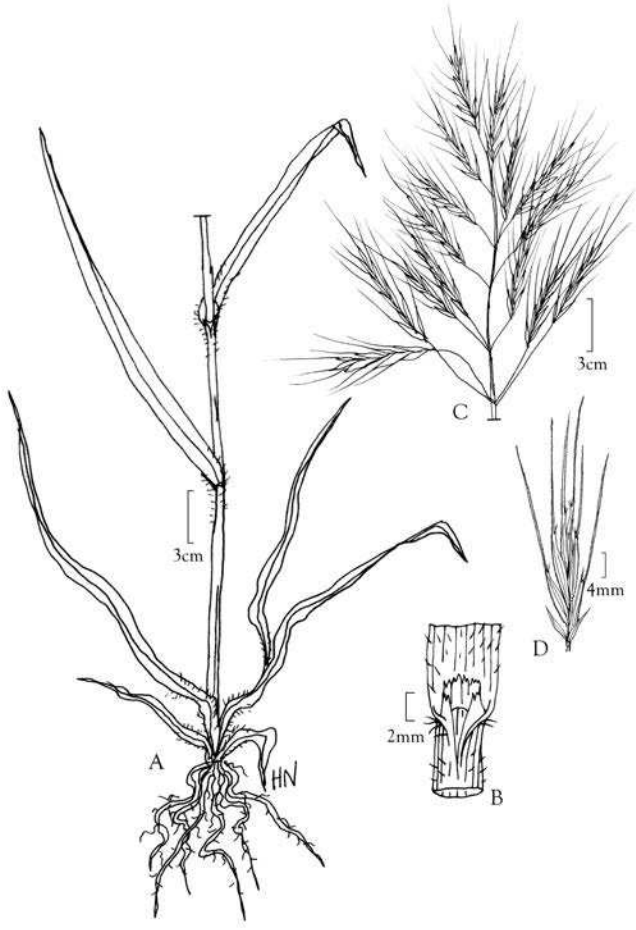


FIGURE 54. *Bromus sterilis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *R. Kanal 347* (US-3230392).

Caespitose annuals. Culms 10–35 cm tall, erect, geniculate, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths closed, sparsely hairy, margins hairy; oral hairs present; ligules 1–3 mm long, membranous, apex lacerate; blades 2–15 cm long, 1.5–2.5 mm wide, linear, flat, flaccid, spreading, sparely hairy to pilose, apex acuminate. Panicles 5–25 cm long, open, ovate, effuse, nodding; primary panicle branches 2–10 cm long, drooping, simple, bearing 1(–3) fertile spikelets on each lower branch, branches flexuous, scaberulous. Spikelets 20–35 mm long, cuneate, laterally compressed; lemmas 1.5–2 cm long, awns 15–40 mm long, straight, bristly. Habitat: weed in cultivated and waste places. Distribution: (unconfirmed) Europe and SW Asia.

46. *Bromus tectorum* L.

FIGURE 55

Bromus tectorum L., Sp. Pl. 1: 77. 1753.
Common names: *abu fakhur, abu keneitla, sabal abu el hosein, safsouf*; cheatgrass, downy brome, downy chess, June grass.

Caespitose or solitary annuals. Culms 10–20 cm tall, erect, geniculate, weak; internodes glabrous; butt sheaths woolly. Leaves basal and cauline; sheaths closed, sparsely hairy, margins smooth; oral hairs present; ligules 3–6 mm long, membranous, apex lacerate; blades 4–15 cm long, 1–3 mm wide, linear, flat, flaccid, spreading, pubescent, margins scabrous, apex acuminate. Panicles 4–18 cm long, contracted, erect, oblong, interrupted (branches clustered), nodding; primary panicle branches drooping, bearing 5–8 fertile spikelets on each lower branch, branches flexuous, scaberulous. Spikelets 10–25 mm long, cuneate, laterally compressed; lemmas 1–1.4 cm long, awns 2.5–6 mm long, straight, bristly. Habitat: sandy and rocky slopes. Distribution: (Mm, Ms, Di, S) temperate Old World.

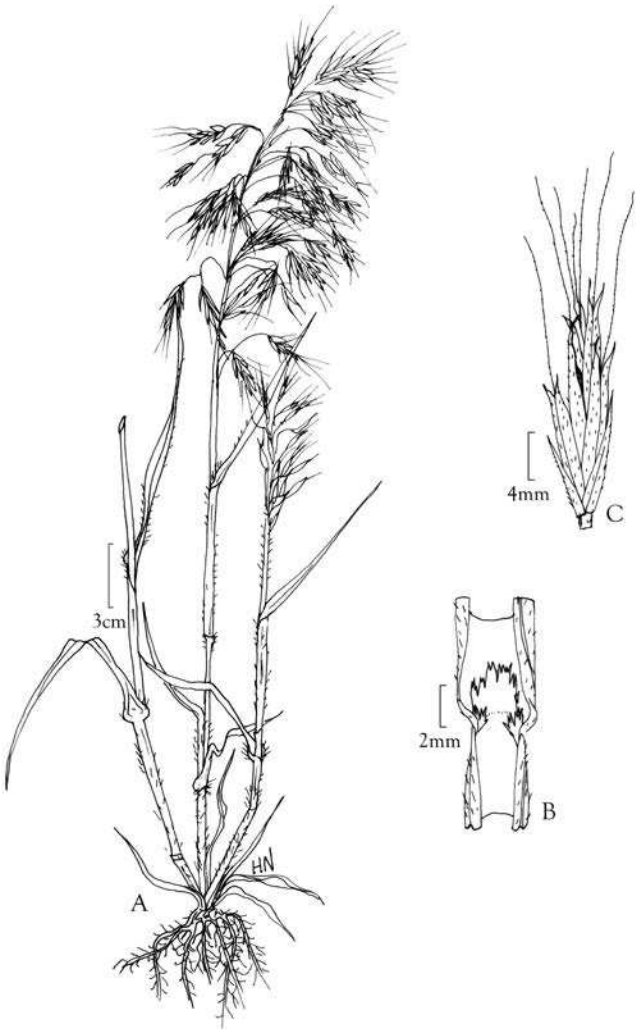


FIGURE 55. *Bromus tectorum*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *E. C. Leonard 2/830* (US-2462603); C modified from Pavlick and Anderton (2007).

KEY TO THE SUBSPECIES

1a. Lower glumes 1-nerved; callus of each fertile floret well differentiated, the florets falling separately . . . . . ***B. tectorum* subsp. *tectorum***

1b. Lower glumes 3-nerved; callus well differentiated in the lower floret only, the florets falling as a unit . . . . . ***B. tectorum* subsp. *lucidus* F. Sales, Fl. & Veg. Mundi 9: 32. 1991**

47. *Catapodium rigidum* (L.) C. E. Hubb.

FIGURE 56

Catapodium rigidum (L.) C. E. Hubb., Fl. Bedfordshire 437. 1953.
Common name: ferngrass.

Caespitose annuals. Culms 2–10 cm tall, erect or ascending, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous, smooth; collars ciliate; ligules 1–3 mm long, membranous, apex lacerate; blades 4–10 cm long, 1–3 mm wide, linear, flat or filiform, wiry, flaccid, spreading, scaberulous, margins scabrous, apex

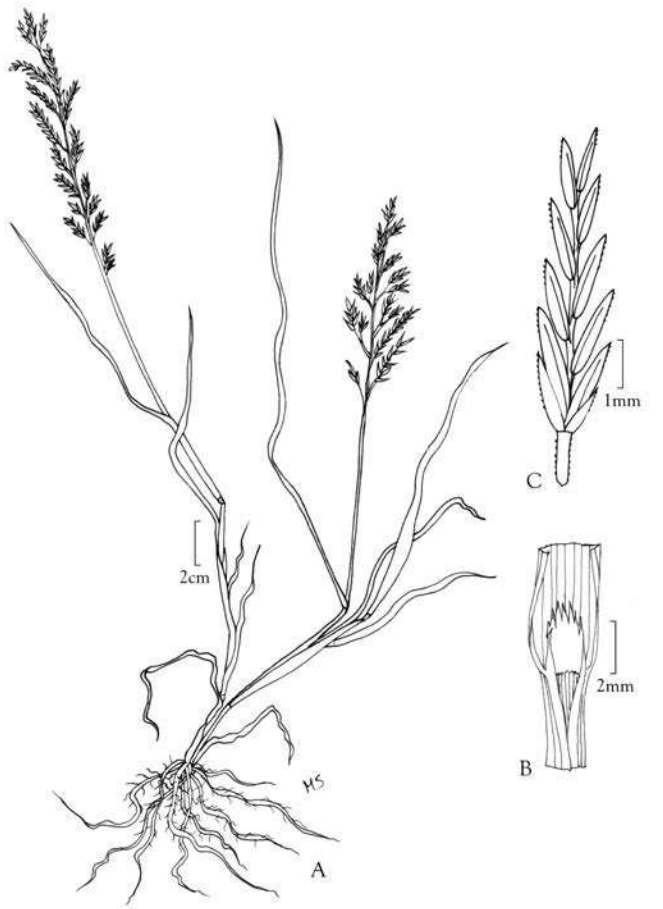


FIGURE 56. *Catapodium rigidum*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *E. Zetterstedt s.n.* (CAI); B, C drawn from *J. Gay s.n.* (US-1007123).

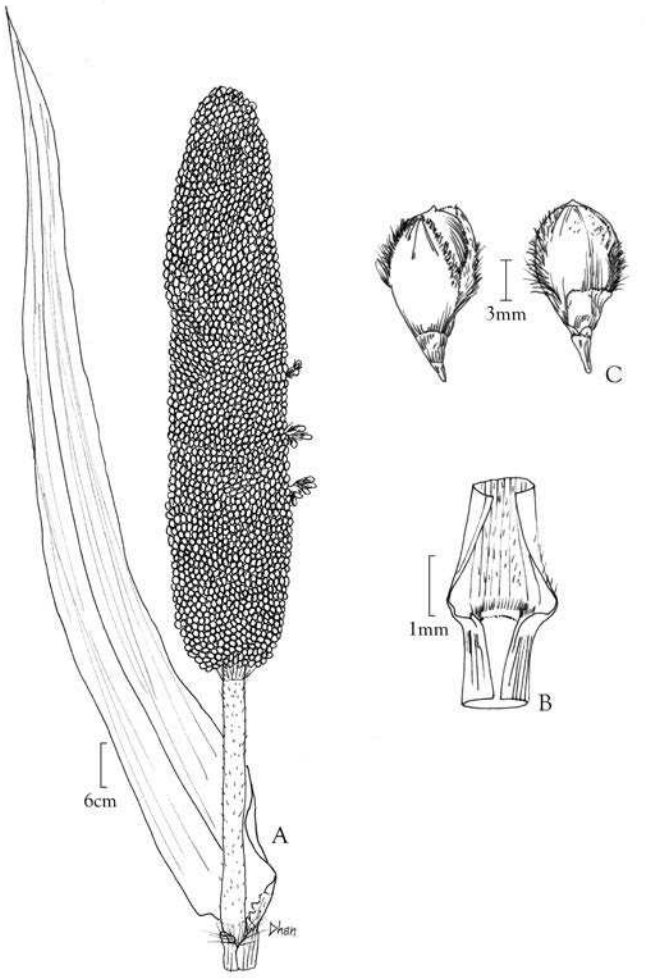


FIGURE 57. *Cenchrus americanus*. A. Flag leaf and inflorescence. B. Ligule, sheath, and blade. C. Spikelets with lower (left) and upper (right) glumes. A modified from Ibrahim and Kabuye (1988); B drawn from *R. Dümmer s.n.* (US-634944); C modified from Hitchcock (1951).

acuminate. Panicles 1–8 cm long, 0.5–2.5 cm wide, open or contracted, linear, lanceolate or ovate, secund, composed of racemes spreading along central axis, racemes single or borne along a central axis, unilateral. Spikelets 4–7 mm long, oblong, laterally compressed; lemmas 2–2.5 mm long, awnless. Habitat: coastal sand and rocky slopes. Distribution: (Mm) S and W Europe, Mediterranean, and SW Asia.

48. *Cenchrus americanus* (L.) Morrone

FIGURE 57

Cenchrus americanus (L.) Morrone, Ann. Bot. (Oxford), n.s., 106: 127. 2010. [*Cenchrus spicatus* (L.) Cav., *Pennisetum glaucum* (L.) R. Br.]

Common names: *dakhn*; cattail millet, pearl millet.

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

49. *Cenchrus biflorus* Roxb.

FIGURE 58

Cenchrus biflorus Roxb., Fl. Ind. 1: 238. 1820.

Caespitose annuals. Culms 10–90 cm tall, erect or ascending; internodes glabrous, glossy or pubescent; nodes dark colored; lateral branches ample, extravaginal, arising from lower culms or mid culms; butt sheaths glabrous. Leaves basal and cauline; sheaths open for most of their length, flattened, keeled, glabrous, margins smooth; oral hairs present or bearded; collars dark, pubescent; ligules 2 mm long, a fringe of hairs; blades 2–20 cm long, 1–5 mm wide, linear or lanceolate, sparsely hairy, scabrous, margins scabrous, bases simple, apex acuminate. Panicles 2–15 cm long, spiciform; involucres 0.4–1.1 cm long, ovoid; inner bristles flattened, united at the base to form a shallow disk 2–4 mm in diameter. Spikelets 3.5–6 mm long, 1–1.5 mm wide, ovate, dorsally compressed, acuminate, subtended by involucres of bristles; lemmas awnless. Habitat: hillsides and waste places. Distribution: (Nv) tropical Africa to India.

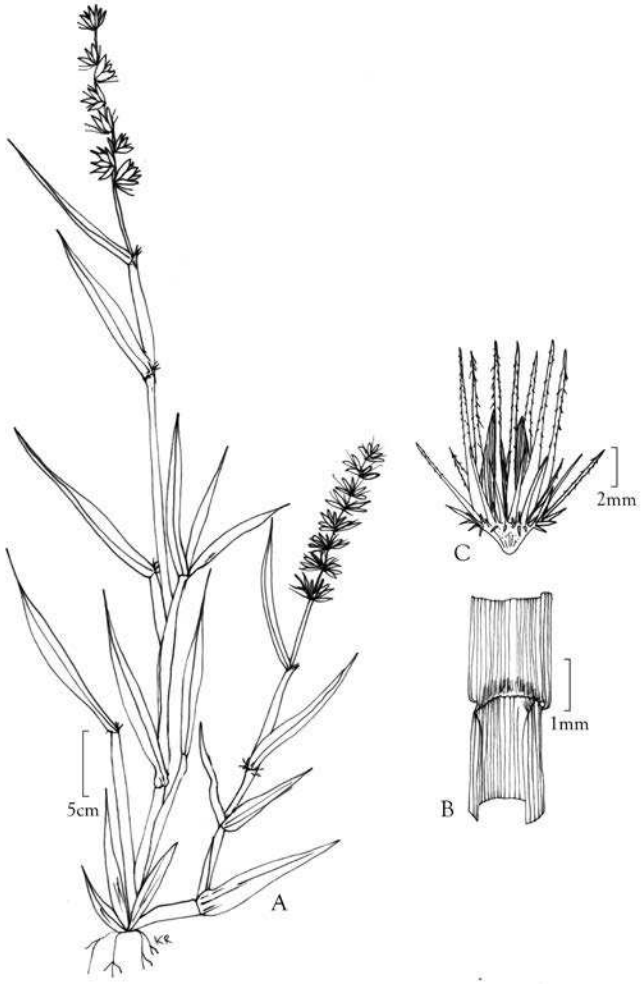


FIGURE 58. *Cenchrus biflorus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 10682* (CAI); B, C drawn from *A. Anderson s.n.* (US-2949200).

50. *Cenchrus ciliaris* L.

FIGURE 59

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

Common names: *abu rokeiba, hemri, rigl el-ghorab*; blue buffel grass, buffel grass.

Caespitose perennials; rhizomes short. Culms 10–50 cm tall, erect, geniculate; internodes sparsely hairy; nodes bearded, sometimes rooting below; butt sheaths pubescent. Leaves basal

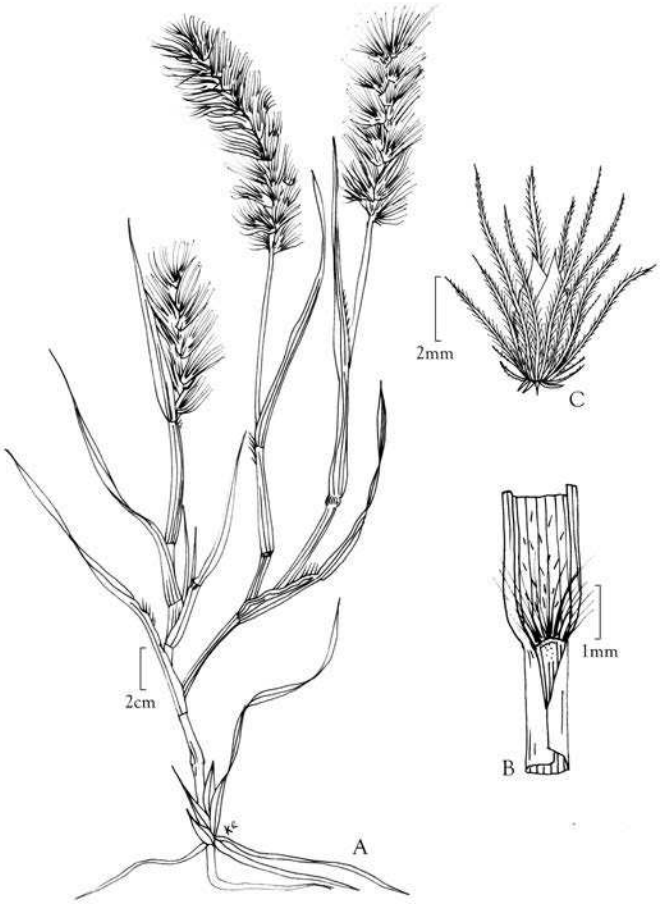


FIGURE 59. *Cenchrus ciliaris*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Abu Raya s.n.* (CAI); B, C drawn from *W. A. Archer 10149* (US-2236373).

and cauline; sheaths loose, strongly compressed, open, sparsely hairy, margins smooth; oral hairs present; ligules 1 mm long, a fringe of hairs; blades 4–20 cm long, 2–8 mm wide, linear, flat, ascending, stiff, ribbed, scabrous, pilose or glabrous, margins scabrous, apex acuminate. Panicles 2–14 cm long, 1–2.6 cm wide; involucres 0.6–1.6 cm long, elongated; inner bristles much exceeding the spikelets, one longer and stouter than the rest. Spikelets 2–5.5 mm long, lanceolate, dorsally compressed, acute, subtended by an involucre of bristles; lemmas awnless. Habitat: desert valleys and waste places. Distribution: (Mm, Nv, Nn, Di, S, Ge) tropical and S Africa to India.

51. *Cenchrus clandestinus** (Hochst. ex Chiov.) Morrone

FIGURE 60

*Cenchrus clandestinus** (Hochst. ex Chiov.) Morrone, Ann. Bot. (Oxford), n.s., 106: 127. 2010. [*Pennisetum clandestinum* Hochst. ex Chiov.]
Common name: Kikuyu grass.

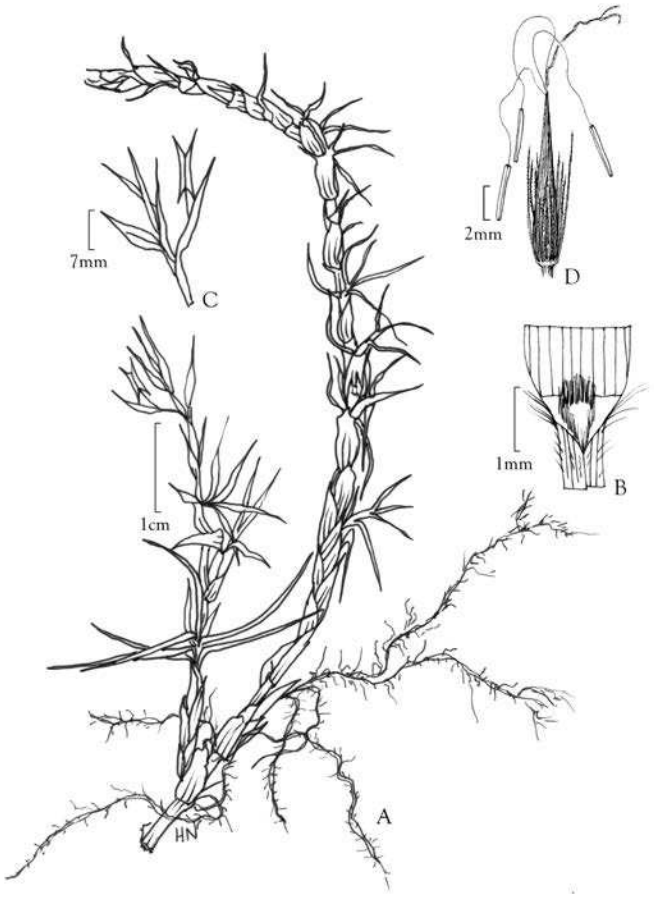


FIGURE 60. *Cenchrus clandestinus*. A. Habit. B. Ligule, sheath, and blade. C. Shoot apex. D. Spikelet. A modified from Ibrahim and Kabuye (1988); B–D drawn from *W. A. Archer 10077* (US-2236357).

Mat-forming perennials; rhizomes elongated; stolons stout, rampant. Culms 3–10 cm tall, decumbent; internodes glabrous; lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths open for most of their length, flattened, hairy on basal ⅓, margins smooth; oral hairs present; ligule a fringe of hairs; blades 1–10 cm long, 1–3 mm wide, linear, flat or conduplicate, spreading, flaccid, scabrous, hairy on ⅓, margins smooth, apex obtuse. Panicles 4–15 mm long, comprising a few spikelets, compact, partially included in the sheath; spikelets subtended by involucre of bristles, deciduous with the fertile spikelets. Spikelets 10–20 mm long, lanceolate, dorsally compressed; lemmas awnless. Habitat: introduced, cultivated fodder. Distribution: (Mm) tropical Africa.

52. *Cenchrus echinatus** L.

FIGURE 61

*Cenchrus echinatus** L., Sp. Pl. 2: 1050. 1753.
Common name: southern sandbur.

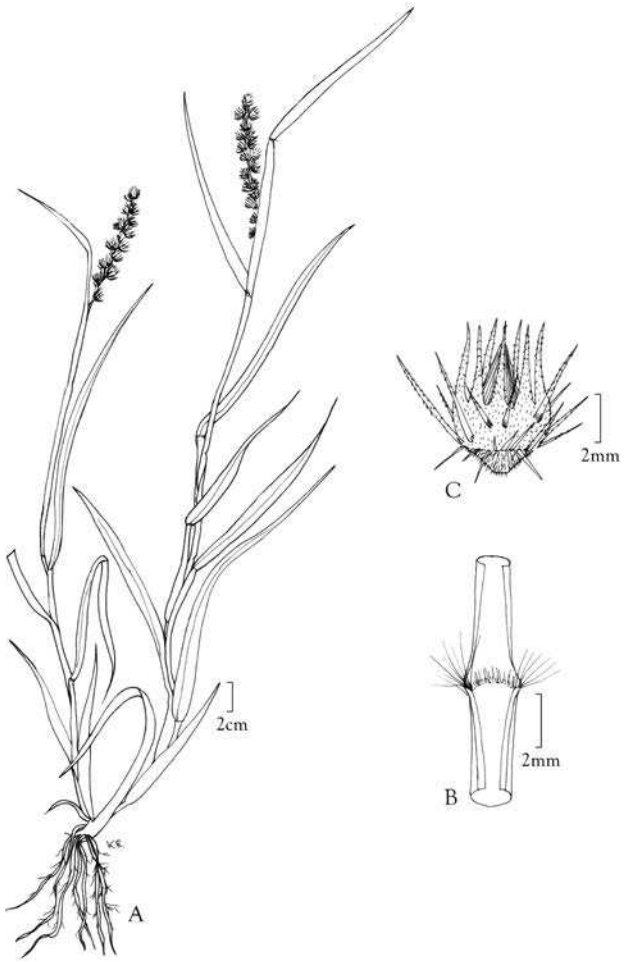


FIGURE 61. *Cenchrus echinatus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *F. Hioram s.n.* (CAI); B, C drawn from *A. Bogdan* (US-2946181).

Caespitose annuals. Culms 10–70 cm tall, erect, geniculate; internodes glabrous, striate, glossy; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened or keeled, open, pubescent, margins hairy; oral hairs present; ligule a fringe of hairs; blades 4–20 cm long, 2–8 mm wide, linear, flat, flaccid, spreading, sparsely hairy, margins scabrous or spinose, apex acuminate. Panicles 2–10 cm long, spiciform, linear, interrupted; involucres 0.5–1 cm wide, globose; inner spines flattened, connate for ½ their length, retrorsely barbellate; outer spines rigid, mostly shorter than the inner. Spikelets 5–7 mm long, ovate, dorsally compressed, acuminate; lemmas awnless. Habitat: weed in waste places. Distribution: (Nv) warmer parts of the New World.

53. *Cenchrus longisetus** M. C. Johnst.

FIGURE 62

*Cenchrus longisetus** M. C. Johnst., Sida 1(3): 182. 1963. [*Pennisetum villosum* R. Br. ex Fresen.]
Common name: feathertop grass.

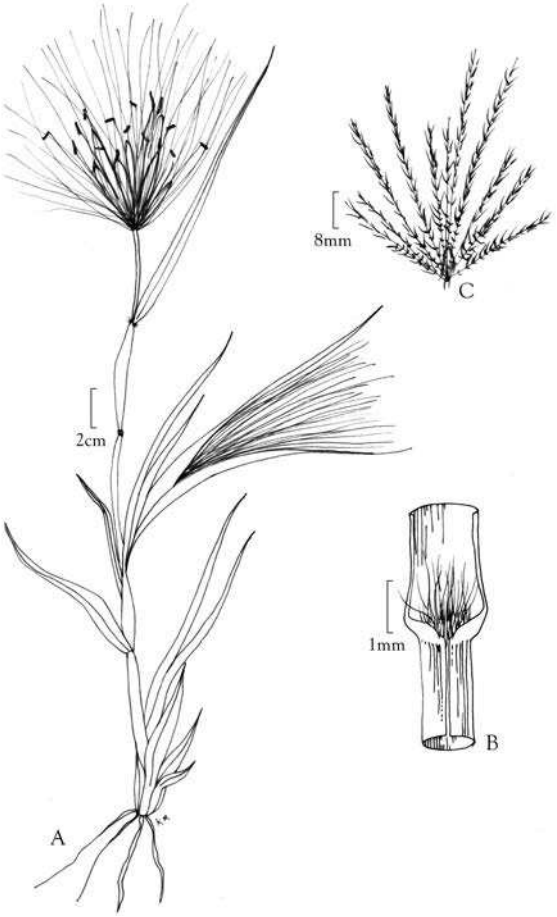


FIGURE 62. *Cenchrus longisetus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Innes 8256* (US-3690547); B, C drawn from *E. Hubbard* (US-3090541).

Mat-forming perennials; rhizomes elongated. Culms 10–55 cm long, erect, geniculate or decumbent; internodes glabrous; lower nodes rooting; butt sheaths pubescent. Leaves basal and cauline; sheaths flattened, open, surfaces glabrous, margins sparingly hairy; auricles absent; oral hairs present; ligule a fringe of hairs; blades 5–15 cm long, 2–5 mm wide, linear, flat, spreading, flaccid, surfaces scabrous, margins smooth, apex acute. Panicles 2–12 cm long, 1–2 cm wide, erect, terminal, compact, oblong, ovate or globose, partially included in sheaths. Spikelets 9–14 mm long, lanceolate, dorsally compressed, cuspidate, subtended by an involucre of bristles. Habitat: cultivated ornamental, sometimes escaping. Distribution: (Mm, Nv) NE tropical Africa and Arabia.

54. *Cenchrus orientalis* (Rich.) Morrone

FIGURE 63

Cenchrus orientalis (Rich.) Morrone, Ann. Bot. (Oxford), n.s., 106: 128. 2010. [*Pennisetum orientale* Rich.]
Common names: *nessie, sabat*; oriental fountain grass.

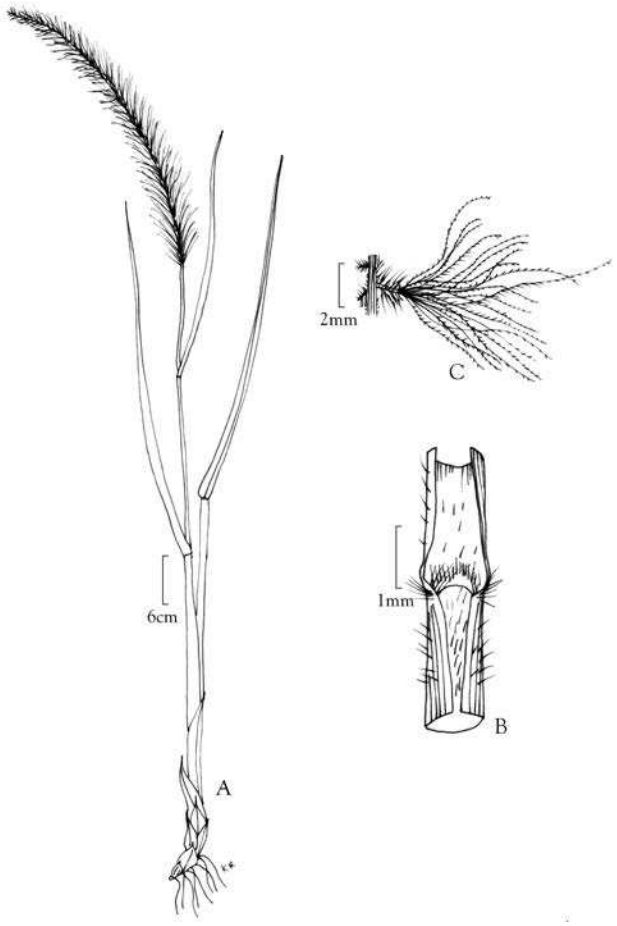


FIGURE 63. *Cenchrus orientalis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *N. El Hadidi, A. Hosny, H. Barakat s.n.* (CAI); B, C drawn from *R. P. Stewart 23271* (US-2011727).

Caespitose perennials; rhizomes short. Culms up to 200 cm tall, lateral branching fastigiate, erect, geniculate, woody; butt sheaths tough, withering, glabrous. Leaves basal and cauline; sheaths glabrous, open, ribbed, margins smooth; ligule a fringe of hairs; blades 30–60 cm long, 5–15 mm wide, linear, convolute, ascending, stiff, pubescent or scabrous, margins scabrous, bases narrow, apex acuminate. Panicles 8–30 cm long, spiciform, continuous or interrupted. Spikelets 4.5–6.5 mm long, lanceolate, dorsally compressed, subtended by an involucre of bristles; lemmas awnless. Habitat: rocky desert. Distribution: (Dg, Da, S) N Africa to northern India and S Asia.

55. *Cenchrus pennisetiformis* Hochst. & Steud.

FIGURE 64

Cenchrus pennisetiformis Hochst. & Steud., Syn. Pl. Glumac. 1: 109. 1854.

Common names: *ribaay, yadaab, za'abal*; cloncurry buffel grass.



FIGURE 64. *Cenchrus pennisetiformis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *M. G. Gillbert & M. Thulin 1248* (US-3077911).

Caespitose annuals or short-lived perennials. Culms 10–50 cm tall, erect, geniculate; internodes glabrous, striate; butt sheaths glabrous. Leaves basal and cauline; sheaths pubescent, margins membranous, smooth; oral hairs present; ligules 1–2 mm long, a fringe of hairs; blades 2–20 cm long, 2–5 mm wide, linear, flat, spreading, flaccid, glabrous, glaucous, margins ciliate, apex acuminate. Panicles 2–6 cm long, spiciform, linear to oblong. Spikelets 3–5 mm long, lanceolate or ovate, dorsally compressed, subtended by an involucre of bristles; lemmas awnless. Habitat: sandy areas. Distribution: (Nv, Ol, Di, Ra, Ge) E tropical Africa to India.

56. *Cenchrus ramosissimus* Poir.

FIGURE 65

Cenchrus ramosissimus Poir., Encycl. 6: 51. 1804. [*Pennisetum divisum* (Forssk. ex J. F. Gmel.) Henrard.]

Common name: *khafoor.*

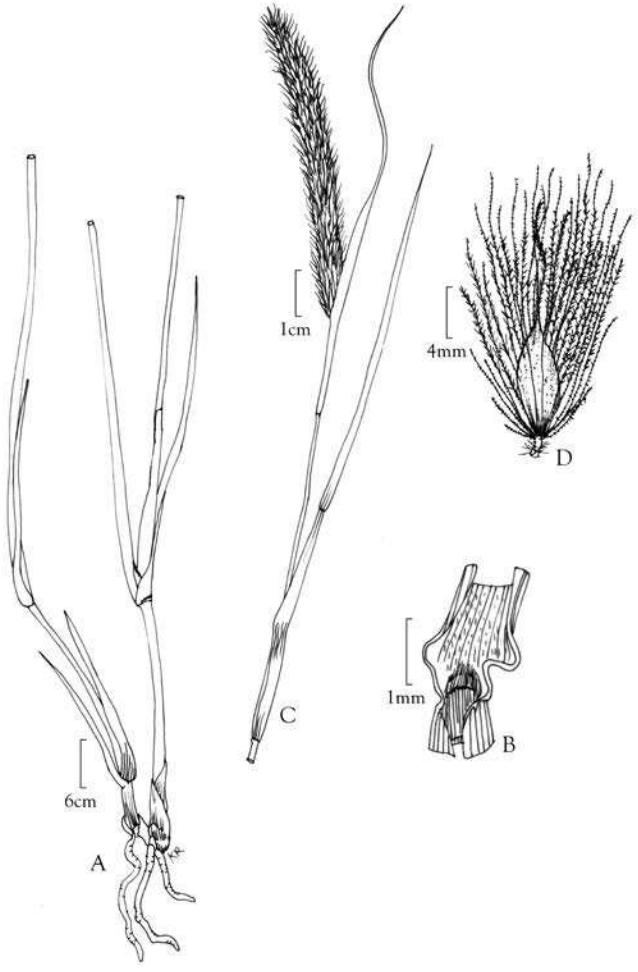


FIGURE 65. *Cenchrus ramosissimus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *Lawand s.n.* (CAI); B–D drawn from *J. Humbles 10037* (US-2852669).

Bushy perennials; rhizomes knotty, short. Culms up to 150 cm tall, erect, woody, rough; internodes glabrous, striate; nodes dark; butt sheaths glabrous. Leaves basal and cauline, glaucous; sheaths longer than blades, flattened, open, ribbed, margins membranous; oral hairs present; ligule a fringe of hairs; blades 3–7 cm long, 1–2 mm wide, linear, involute, appressed, straight, deciduous at the ligules, scabrous, glaucous, margins smooth, apex spiny, pungent. Panicles 5–12 cm long, spiciform, oblong; primary branches accrescent to a central axis; involucres 7–20 mm long, consisting of 1 sessile spikelet borne on a short oblong stipe. Spikelets 6.5–8.5 mm long lanceolate, dorsally compressed, falling entire, deciduous with accessory branch structures; lemmas awnless. Habitat: sandy soils. Distribution: (Nv, Dl, Dg, Di, Ol, On, S, Rz, Rq, Ra) N Africa to India.

57. *Cenchrus setaceus* (Forssk.) Morrone

FIGURE 66

Cenchrus setaceus (Forssk.) Morrone, Ann. Bot. (Oxford), n.s., 106: 129. 2010. [*Pennisetum setaceum* (Forssk.) Chiov.]

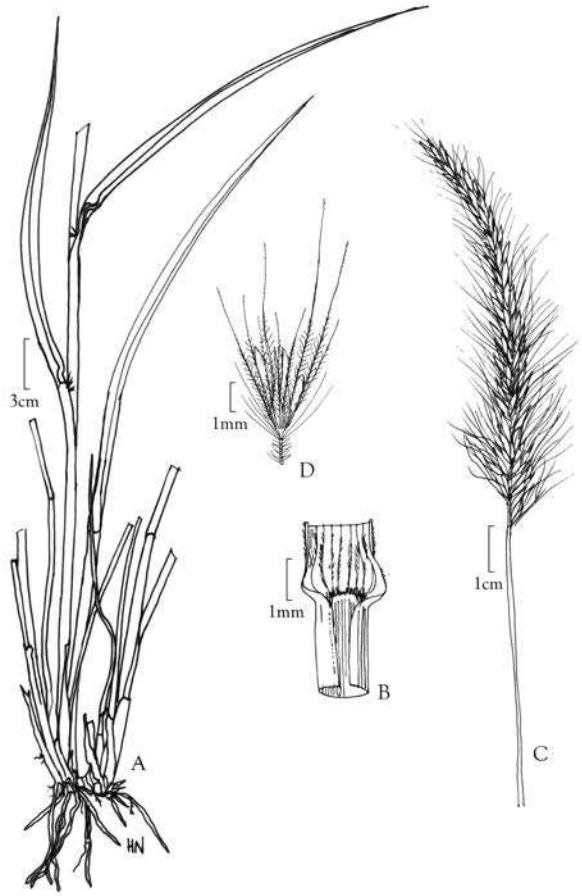


FIGURE 66. *Cenchrus setaceus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence D. Spikelet. A drawn from *L. Boulos & Khalifa 3753* (CAI); B–D drawn from *A. Balsinas 3490* (US-3193078).

Common names: *banias, hadaa, halfa, hanteeb, retem, sabat*; purple fountain grass.

Densely caespitose perennials. Culms 20–100 cm tall, erect, woody, lateral branching fastigiate; butt sheaths glabrous. Leaves basal and cauline; internodes glabrous, glaucous; sheaths glabrous, margins ciliate; oral hairs present; ligule a fringe of hairs; blades 10–30 cm long, 1–3 mm wide, glaucous, linear, convolute, spreading, with noticeably thickened midrib on the upper surface, scabrous, margins smooth, apex acute. Panicles 6–30 cm long, spiciform, linear; involucre enclosing 1 sessile and 0–2 pedicellate spikelets. Spikelets 4.5–6.5 mm long, lanceolate, dorsally compressed, subtended by an involucre of bristles; lemmas awnless. Habitat: deserts and weed of cultivated gardens. Distribution: (Mm, Nv, Di, S, Ge) E tropical and N Africa to SW Asia.

58. *Cenchrus setiger* Vahl

FIGURE 67

Cenchrus setiger Vahl, Enum. Pl. 2: 395. 1806.
Common names: *hanteeb, yaraab*; birdwood grass.

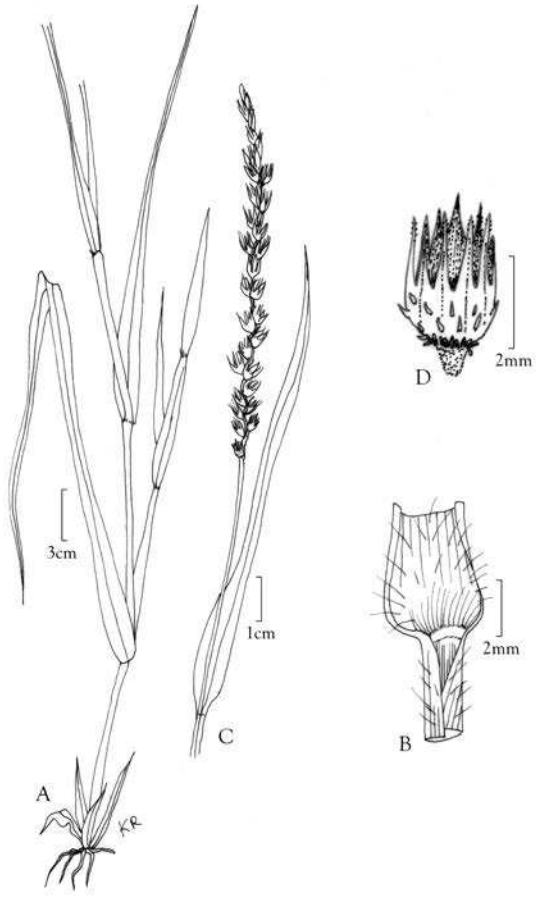


FIGURE 67. *Cenchrus setiger*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *W. Burger 3211* (US-2465134).

Caespitose perennials. Culms 10–70 cm tall, erect, geniculate, weak; internodes glabrous; nodes dark; butt sheaths pubescent, forming bulbous bases. Leaves basal and cauline; sheaths longer than adjacent internodes, hairy; oral hairs present; ligules 1–2 mm long, a fringe of hairs; blades 4–20 cm long, 2–6 mm wide, linear, flat, ascending, sparsely hairy, margins scabrous, apex acuminate. Panicles 2–12 cm long, spiciform, linear; involucres 3–7 mm, cup shaped. Spikelets 3–5 mm long, ovate, dorsally compressed, acuminate, subtended by involucre of connate bristles, 1–3 per involucre; lemmas awnless. Habitat: sandy soils and weed of cultivation. Distribution: (Ol, Ra, Ge) E tropical Africa, Arabia to India.

59. *Cenchrus sieberianus* (Schltdl.) Verloove

FIGURE 68

Cenchrus sieberianus (Schltdl.) Verloove, Willdenowia 42(1): 78. 2012. [*Pennisetum sieberianum* (Schldl.) Stapf & C. E. Hubb.]

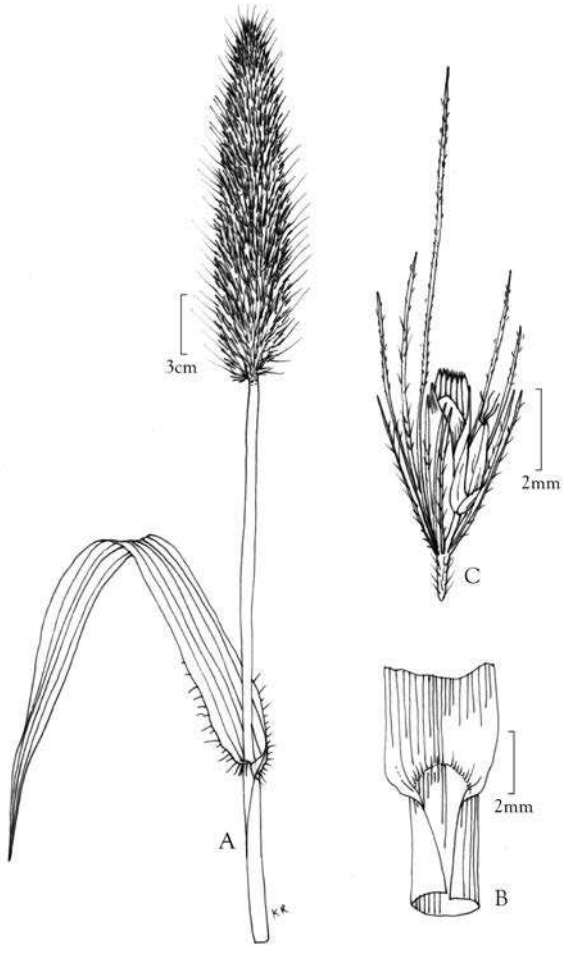


FIGURE 68. *Cenchrus sieberianus*. A. Inflorescence and culm. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B, C drawn from *J. G. Adam* 19906 (US-2464577).

Caespitose annuals; rhizomes absent. Culms up to 120 cm tall, erect, robust; internodes tomentose; nodes bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths open, hairy, margins smooth; oral hairs present; ligule a fringe of hairs; blades 50–100 cm long, 20–40 mm wide, linear, flat, spreading, flaccid, hairy on basal ⅓, margins ciliate, apex acute. Panicles 5–15 cm long, 1–3 cm wide, compact, linear, partially included in sheaths. Spikelets 4–6 mm long, lanceolate, elliptic or obovate, dorsally compressed, subtended by involucres of bristles; lemmas awnless. Habitat: weed of cultivation. Distribution: (Nv, Nn, Da, Ol, On, Ge) cultivated in the tropics.

60. *Cenchrus violaceus** (Lam.) Morrone

FIGURE 69

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

Annuals forming patchy cushions. Culms 3–10 m long, decumbent; internodes glabrous; lower nodes rooting; butt sheaths

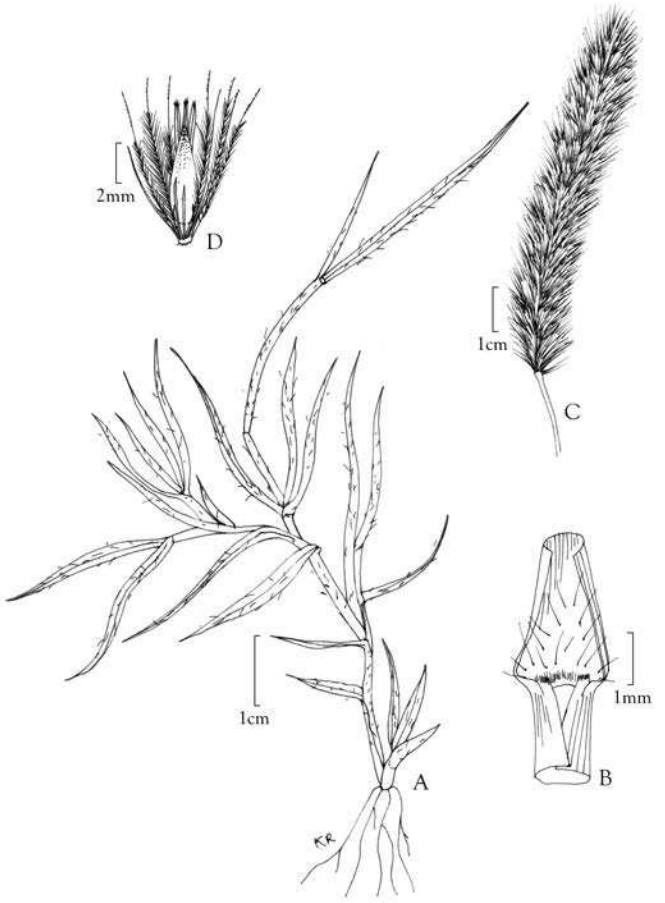


FIGURE 69. *Cenchrus violaceus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *N. El Hadidi s.n.* (CAI); B–D drawn from *J. G. Adam 19906* (US-2464693).

glabrous. Leaves basal and cauline; sheaths flattened, open, hairy on basal ⅓, margins smooth; oral hairs present; collars dark; ligule a fringe of hairs; blades 1–10 cm long, 1–3 mm wide, hairy, linear, flat or conduplicate, spreading, flaccid, scabrous, margins smooth, apex acute. Panicles 2.5–20 cm long, 0.8–2 cm wide, spiciform, partially included in sheaths. Spikelets 4–7 mm long, lanceolate, dorsally compressed, subtended by an involucre of bristles; lemmas awnless. Habitat: weed of cultivation. Distribution: (Nv) tropical Africa and the foothills of Saharan mountains.

61. *Centropodia forskalii* (Vahl) Cope

FIGURE 70

Centropodia forskalii (Vahl) Cope, Kew Bull. 37: 658. 1983. Common names: *negil el naaga, qamh el afrit*.

Caespitose perennials or facultative annuals. Culms 10–50 cm tall, erect, solid, pubescent; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than adjacent internodes, strongly compressed, surfaces ribbed, pubescent, margins membranous; oral hairs present; ligules 1–2 mm long, a fringe of hairs; blades 1–7 cm long, 2–5 mm wide, flat, stiff, appressed, sparsely hairy, margins scabrous, apex pungent. Panicles 1–20 cm long, 0.5–2 cm wide, erect, terminal, contracted, elongated, partially included in sheath. Spikelets 7–9 mm long, lanceolate, laterally compressed; lemmas 3.7–5.2 mm long, awns 3–5 mm long, straight. Habitat: sandy soils in dunes and gravelly sites. Distribution: (Mm, Ms, Nv, Nn, Dl, Di. S, Ge) tropical and N Africa to C Asia.

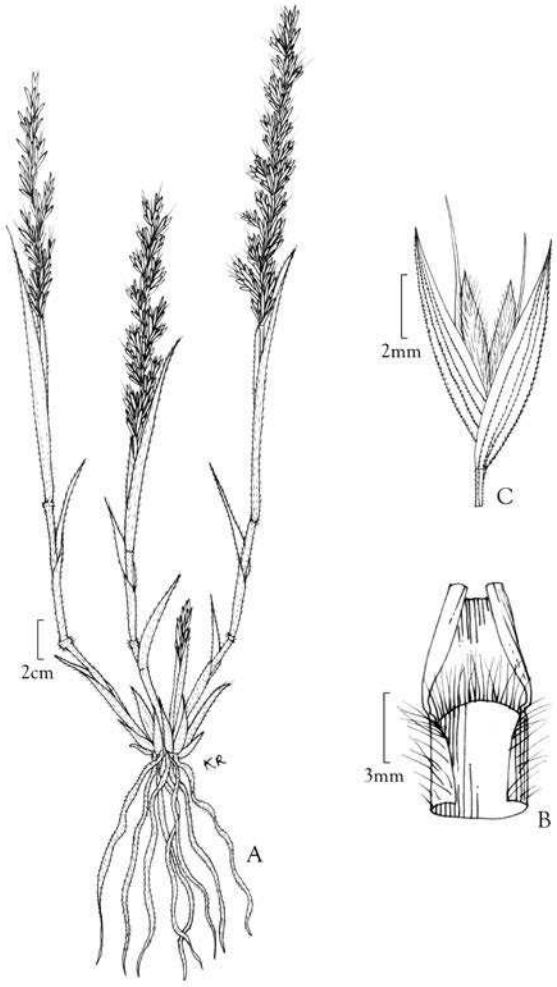


FIGURE 70. *Centropodia forskalii*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 9358* (CAI); B, C drawn from *J. Bornmuller 11082* (US-1127795).

62. *Centropodia fragilis* (Guinet & Sauvage) Cope

FIGURE 71

Centropodia fragilis (Guinet & Sauvage) Cope, Kew Bull. 37: 658. 1983.

Caespitose perennials; rhizomes knotty, short; root gathering sand. Culms 50–120 cm tall, erect, solid, pubescent; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy,

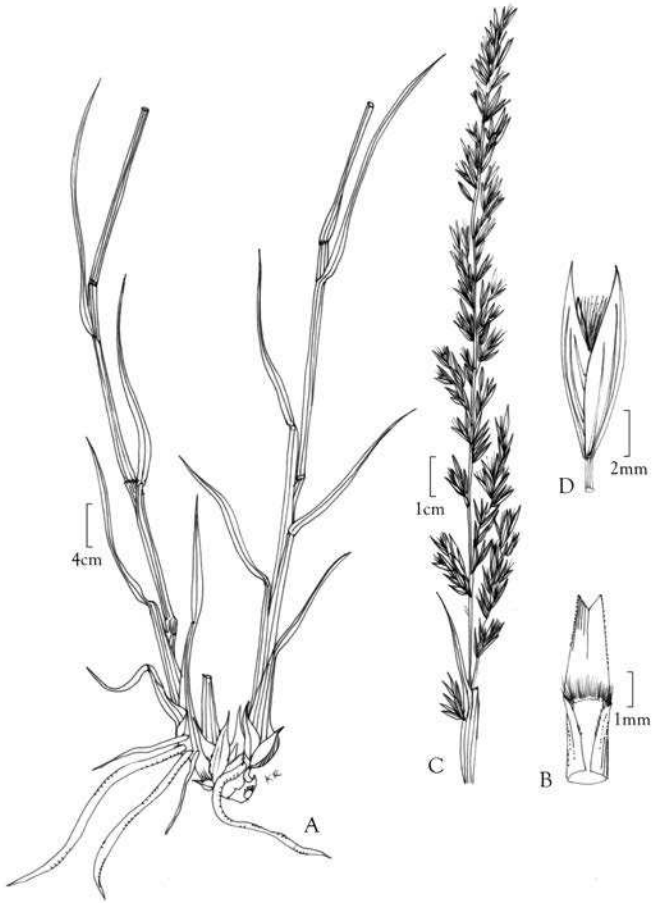


FIGURE 71. *Centropodia fragilis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *M. Drar 61413* (CAI), B–D drawn from *S. Chaudharry s.n.* (K- H2012/00899).

margins membranous; oral hairs present; ligules 1 mm long, a fringe of hairs; blades 2–10 cm long, 2–4 mm wide, deciduous at the ligules, linear, filiform, stiff, appressed, surfaces ribbed, pubescent, margins scabrous, apex pungent. Panicles 15–30 cm long, 2–3 cm wide, contracted, linear or lanceolate, partially included in sheath. Spikelets 8–10 mm long, lanceolate, laterally compressed; lemmas 4.8–6 mm long, awns 3 mm long. Habitat: sandy and gravelly soils. Distribution: (Di) N Africa to Arabia.

63. *Chloris flagellifera* (Nees) P. M. Peterson

FIGURE 72

Chloris flagellifera (Nees) P. M. Peterson, Taxon 64(3): 458. 2015. [*Ochthochloa compressa* (Forssk.) Hilu; *Panicum compressa* Forssk. non *Chloris compressa* DC.]

Caespitose perennials; stolons present. Culms up to 100 cm tall, prostrate, decumbent; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, glabrous, margins membranous; oral hairs present; ligules 1–2 mm long, ciliolate membranes; blades 5–40 cm long, 1–3 mm wide, glaucous, linear, flat, spreading, straight, scabrous or pilose, margins scabrous, apex acuminate, spiny, pungent. Inflorescences 1.5– 4.5 cm long with (2–)3–5 digitately arranged racemes, the racemes spreading. Spikelets 6–8 mm long, elliptic or oblong, laterally compressed; 4–5.6 mm long, awnless. Habitat: sandy and rocky slopes. Distribution: (Ra, Ge) NE Africa to NW India.

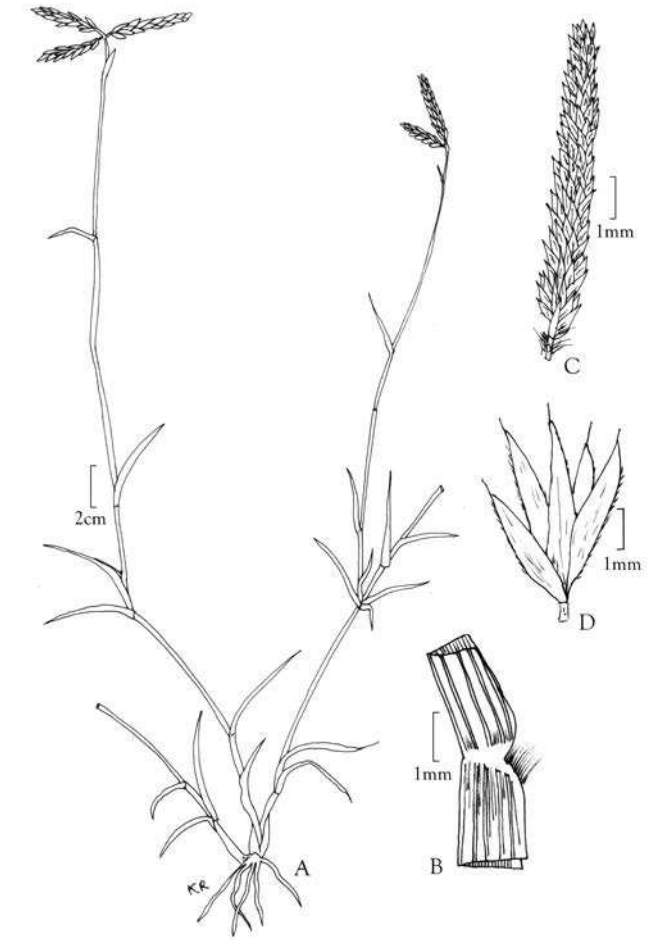


FIGURE 72. *Chloris flagellifera.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from *Khodeir s.n.* (CAI); B, D drawn from *W. Burger 2903* (US-2465131).

64. *Chloris gayana* Kunth

FIGURE 73

Chloris gayana Kunth, Révis. Gramin. 1: 293, pl. 58. 1830. Common name: rhodes grass.

Caespitose perennials; stolons present. Culms up to 200 cm tall, erect, geniculate; internodes glabrous, striate; occasionally

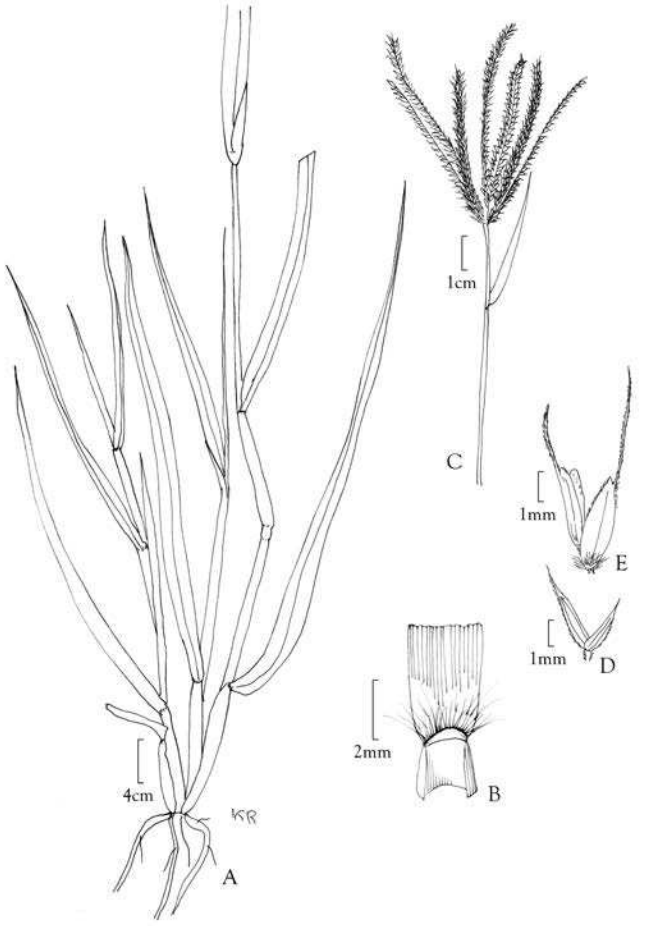


FIGURE 73. *Chloris gayana.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Glumes. E. Spikelets. A, C modified from Ibrahim and Kabuye (1988); B, D, E drawn from *A. J. Oakes 364450* (US-3025905).

lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths strongly compressed, keeled, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 15–25 cm long, 2–9 mm wide, linear, flat, ascending, hairy on the basal ⅓, margins smooth, apex attenuate. Inflorescences 4–15 cm long, with (5–)7–20 digitately arranged racemes, the racemes spreading or ascending, the spikelets packed broadside to rachis. Spikelets 2.5–4 mm long, 3–4-flowered, cuneate, laterally compressed; fertile lemmas 2.9–3.2 mm long, awns 1.5–5.5 mm long, straight, bristly. Habitat: woodlands, weed of cultivation, and waste places. Distribution: (Mm, Nv, Nn, Ol) tropical and S Africa.

65. *Chloris prieurii* Kunth

FIGURE 74

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

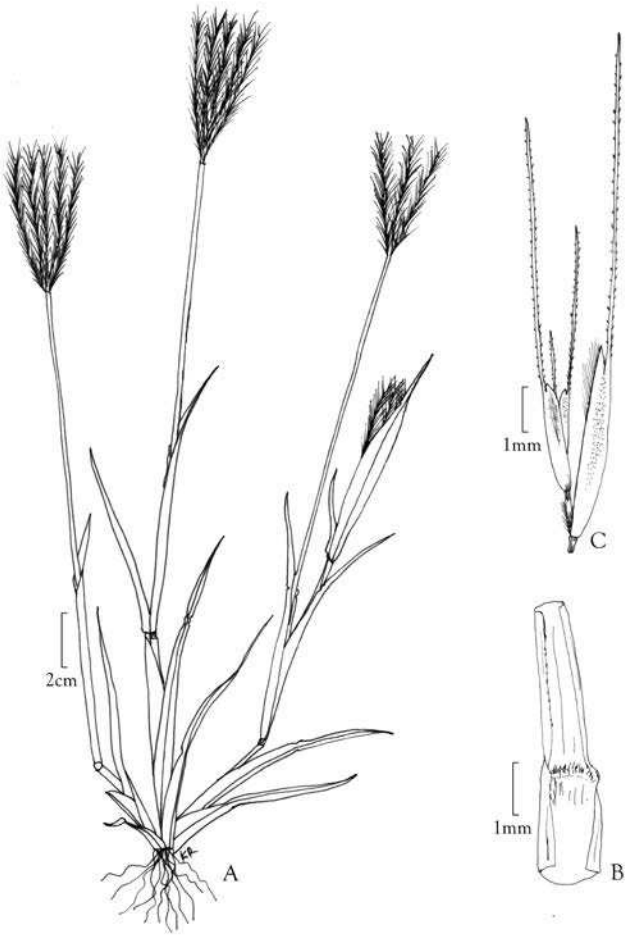


FIGURE 74. *Chloris prieurii*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *S. Lægaard & S. Traore 17061* (US-3595001).

Caespitose annuals. Culms 15–85 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths withering, glabrous. Leaves basal and cauline; sheaths much longer than blades, glabrous, ribbed, margins smooth; ligules 1–2 mm long, ciliate or a ciliolate membrane; blades 8–25 cm long, 1–3 mm wide, linear, conduplicate, ascending or spreading, glabrous, margins scabrous, bases narrow, apex acuminate. Inflorescence with 4–9 digitately borne racemes; racemes 4–12 cm long, unilateral; rachis angular. Spikelets 3–5 mm long, 4–6-flowered, elliptic, dorsally compressed; fertile lemmas 3–5 mm long, awns 7–17 mm long, straight, bristly. Habitat: sandy soils. Distribution: (Da, Ra, Sa) tropical Africa and Arabia.

66. *Chloris pycnothrix* Trin.

FIGURE 75

Chloris pycnothrix Trin., Gram. Unifl. Sesquifl. 234. 1824.

Caespitose annuals. Culms 20–50 cm tall, erect, geniculate; internodes glabrous, straw colored; nodes dark; often lower

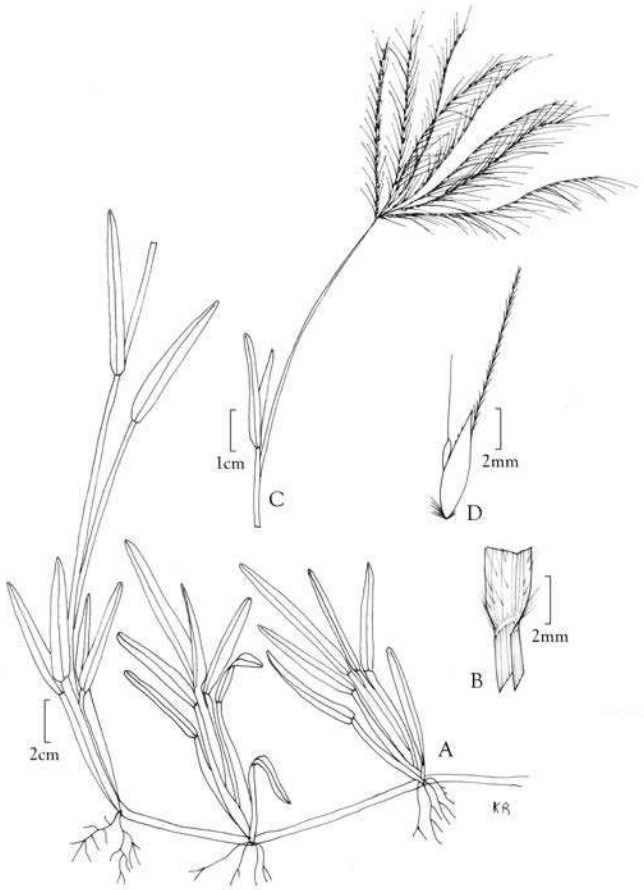


FIGURE 75. *Chloris pycnothrix*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *Ndegwa 592* (US-2589232).

nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths keeled, open, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 2–10 cm long, 2–3 mm wide, linear, flat, flaccid, margins hairy, hairy on the basal ⅓, apex obtuse. Inflorescences 4–10 cm long with 4–6 digitate racemes spreading or ascending. Spikelets 2–2.5 mm long, 2-flowered, cuneate, laterally compressed; fertile lemmas 2.3–2.6 mm long, mucronate, the mucro 0.6 mm long. Habitat: grassland, weed of cultivation, and waste places. Distribution: (Nv) tropical Africa, Arabia, and S America.

67. *Chloris virgata* Sw.

FIGURE 76

Chloris virgata Sw., Fl. Ind. Occid. 1: 203. 1797.
Common name: feather finger grass.

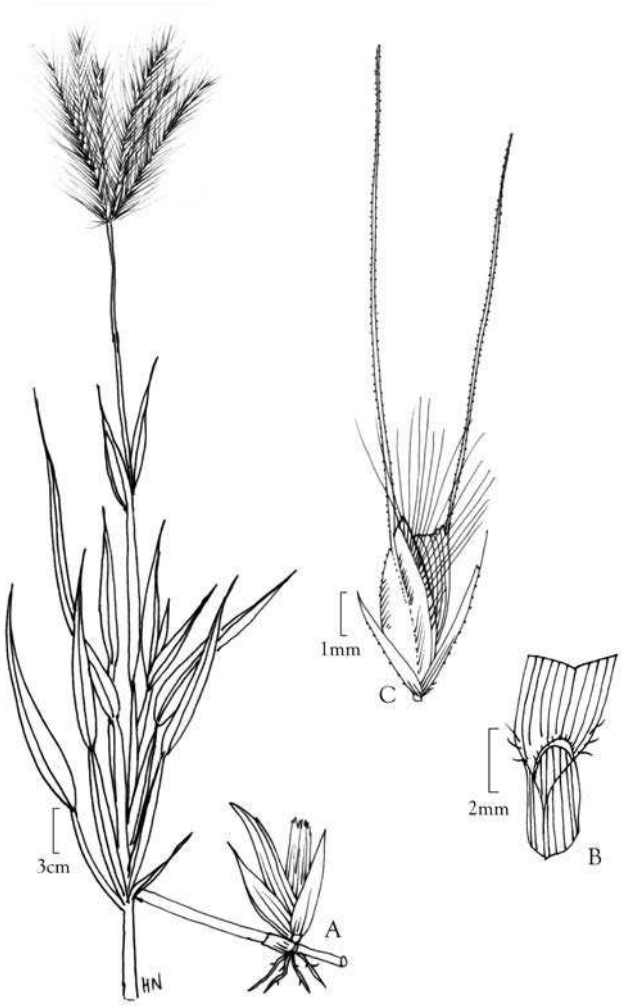


FIGURE 76. *Chloris virgata*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, L. Boulos, M. Zahran 204, 236* (CAI); B, C drawn from *B. Wennell* (US-1446109).

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

68. *Chrysopogon plumulosus* Hochst.

FIGURE 77

Chrysopogon plumulosus Hochst., Jahreshefte 3: 62. 1847.

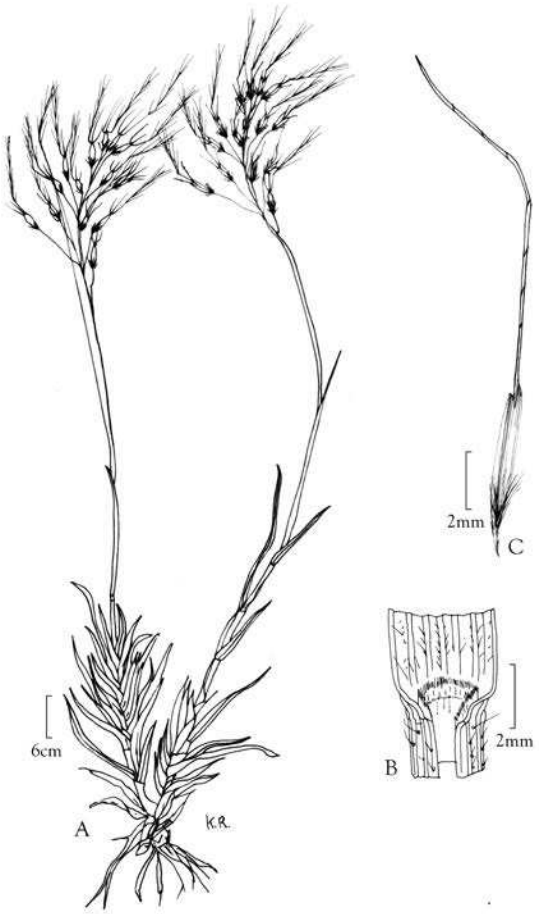


FIGURE 77. *Chrysopogon plumulosus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *A. Linsen & W. Giesen 34* (US-2909758).

Caespitose perennials; roots aromatic. Culms up to 300 cm tall, erect, wiry, glabrous; butt sheaths glabrous. Leaves basal and cauline, sometimes forming a compact cushion; sheaths glabrous, basal sheaths sometimes laterally compressed, margins smooth; ligules 1 mm long, a fringe of hairs; blades 10–30 cm long, 2–8 mm wide, linear, flat, ascending, glaucous, glabrous, or pubescent, margins scabrous, apex abruptly acute. Panicles 3–7 cm long, open, ovate, with whorls of branches bearing terminal racemes each with three spikelets. Sessile spikelets 5.5–8 mm long, oblong, laterally compressed; upper glumes with a bristly awn; upper lemma awns 20–30 mm long, geniculate, twisted. Habitat: rocky sites. Distribution: (Ge) NE Africa and Arabia.

69. *Chrysopogon zizanioides** (L.) Roberty

FIGURE 78

*Chrysopogon zizanioides** (L.) Roberty, Bull. Inst. Franç. Afrique Noire, sér. A, 22: 106. 1960.

Common name: vetiver grass.

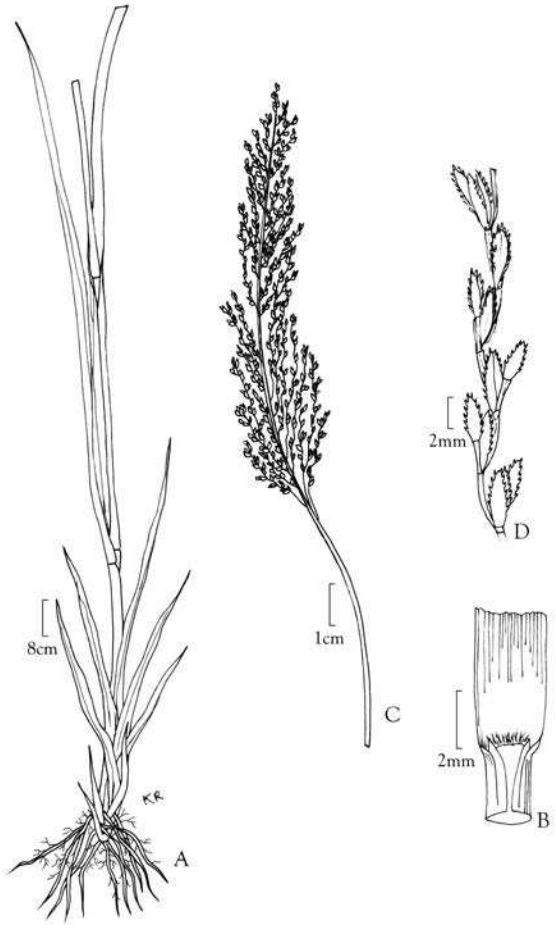


FIGURE 78. *Chrysopogon zizanioides.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Inflorescence branch. A–D drawn from *G. Davidse & D. B. Smithraarachchi 9049* (US-2884821).

Caespitose perennials; roots aromatic; rhizomes short. Culms up to 300 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 1–2 mm long, a fringe of hairs; blades 30–100 cm long, 5–10 mm wide, linear, flat, ascending, scabrous, margins scabrous, apex acuminate. Panicles 15–40 cm long, open, lanceolate, with whorls of branches bearing a terminal raceme, each with two spikelets. Sessile spikelets 3.5–5 mm long, linear, laterally compressed; lemmas awnless. Habitat: cultivated. Distribution: (Nv) introduced, native to India.

70. *Coelachyrum brevifolium* Hochst. & Nees

FIGURE 79

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

Common name: *manteeb*.

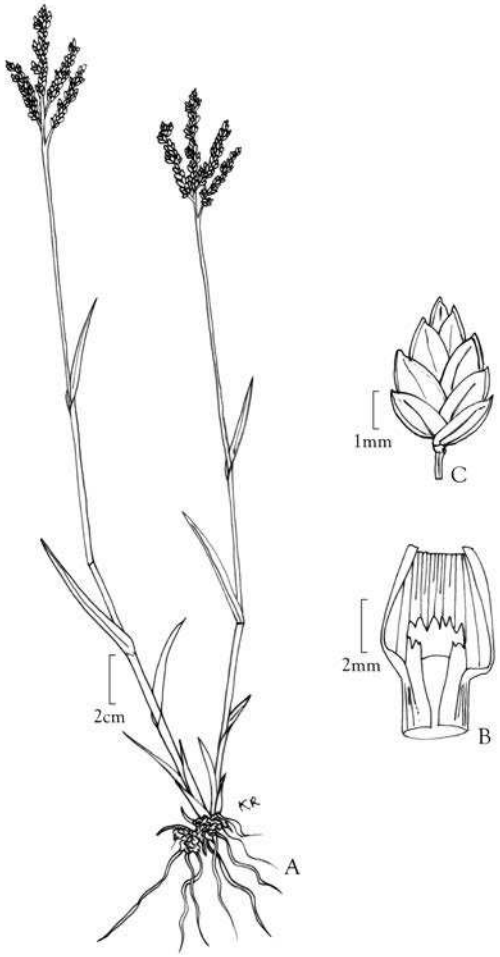


FIGURE 79. *Coelachyrum brevifolium.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Salaby, M. Zahran 1402* (CAI); B drawn from *F. N. Andrews 26* (US-3048192); C modified from Cope (2005).

Caespitose annuals; stolons present. Culms 10–50 cm tall, geniculate; internodes glabrous, striate, straw colored; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, glabrous, margins membranous; ligules 1–2 mm long, membranous, apex dentate; blades 2–5 cm long, 1.5–4 mm wide, glabrous, margins smooth. Inflorescences 1–5 cm long with 3–5 digitate racemes. Spikelets 3.5–4 mm long, ovate, laterally compressed, subsessile; lemmas 1.6–2.2 mm long, membranous, pilose, awnless. Habitat: sandy soils. Distribution: (Ge) N Africa and Arabia.

71. *Coix lacryma-jobi** L.

FIGURE 80

*Coix lacryma-jobi** L., Sp. Pl. 2: 972. 1753.
Common names: *dimo' ayoub*; Job's tears.

Caespitose annuals; plants monoecious. Culms up to 200 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous.

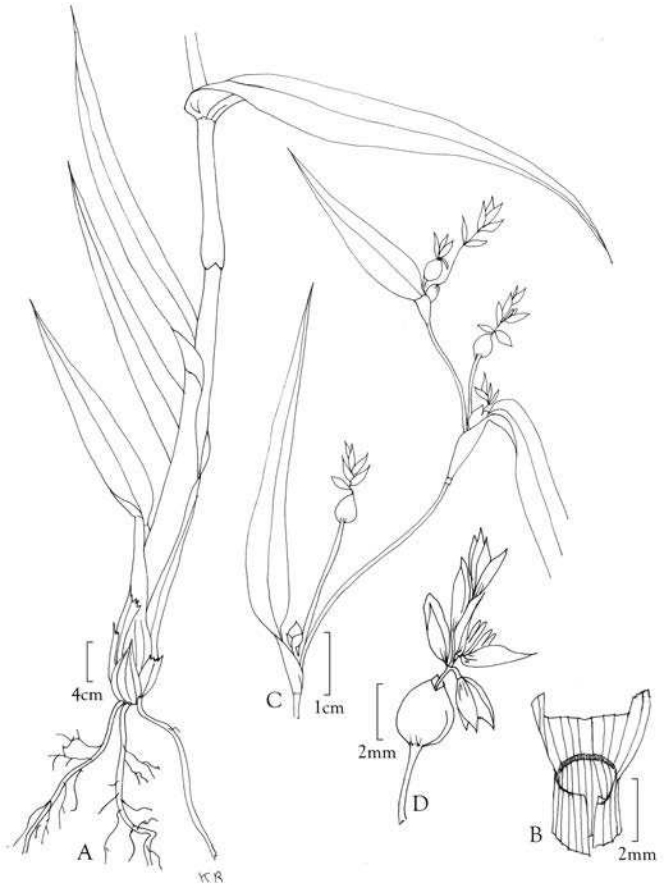


FIGURE 80. *Coix lacryma-jobi.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D drawn from *M. Hassib s.n.* (CAI), Ibrahim and Kabuye (1988); B drawn from *W. R. Luke 3305* (US-3262016).

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

72. *Cortaderia selloana** (Schult. & Schult.f.) Asch. & Graebn.

FIGURE 81

*Cortaderia selloana** (Schult. & Schult.f.) Asch. & Graebn., Syn. Mitteleur. Fl. 2: 325. 1900.
Common name: pampas grass.

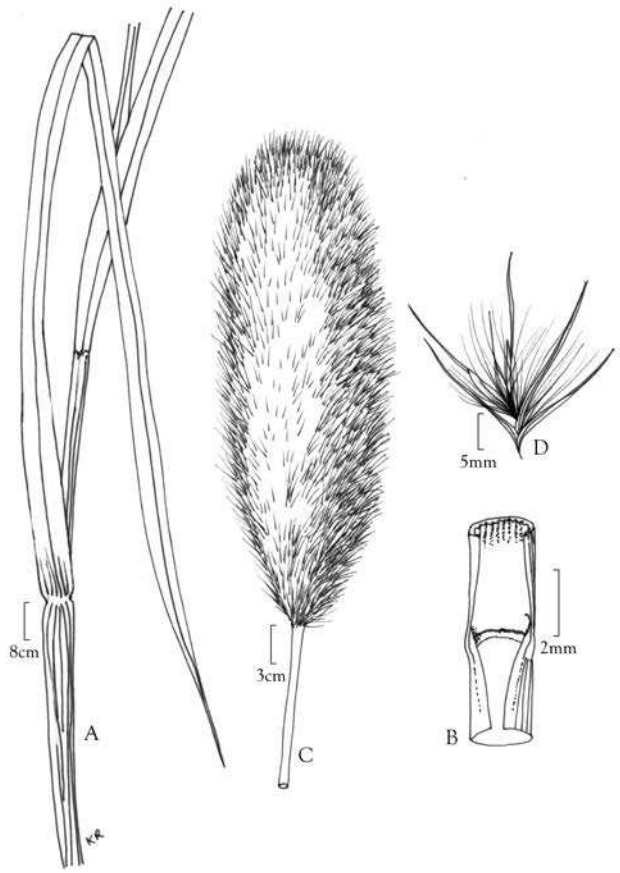


FIGURE 81. *Cortaderia selloana.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *Loco Ignoto s.n.* (CAI); B–D drawn from *R. Wasum 458* (US-3405065).

Caespitose perennials; plants gynodioecious. Culms up to 300 cm tall; stout, erect; internodes rough; butt sheaths glabrous. Leaves basal and cauline; sheaths scabrous, margins scabrous; ligules 1–2 mm long, a fringe of hairs; blades 50–150 cm long, 2–15 mm wide, linear, involute, straight, coriaceous, scabrous, margins serrate, apex acuminate. Panicles 25–100 cm long, open, ovate, densely flowered. Spikelets 12–18 mm long, lanceolate, laterally compressed; lemmas awnless. Habitat: cultivated. Distribution: (Nv) introduced from S America.

73. *Corynephorus divaricatus* (Pourr.) Breistr.

FIGURE 82

Corynephorus divaricatus (Pourr.) Breistr., Proc. Verb. Soc. Dauph. Etud. Biol. Grenoble, Ser. 3, 17: 3. 1950.

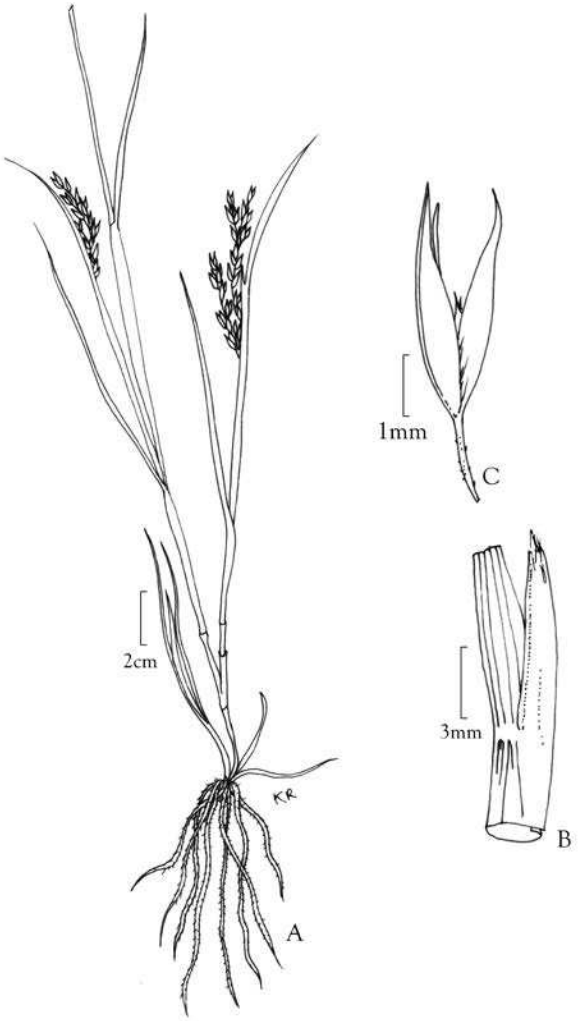


FIGURE 82. *Corynephorus divaricatus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Pitard s.n.* (CAI); B, C drawn from *J. Bornmuller 1626* (US-1109517).

Caespitose annuals. Culms 5–40 cm tall, erect; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths strongly compressed, keeled, striate, glabrous, margins smooth; ligules 6–10 mm long, membranous, apex acute; blades 5–40 cm long, 1–3 mm wide, linear; filiform, wiry, ascending, scabrous, margins scabrous, bases cordate, apex acuminate. Panicles 2–10 cm long, 0.5–7 cm wide, open, ovate; spikelets clustered toward branch tip. Spikelets 4–4.5 mm long, oblong, laterally compressed; lemmas 1.5–2 mm long, awns 2.5 mm long, column twisted. Habitat: coastal sandy areas. Distribution: (Mm, Ms) Mediterranean region to the Caspian.

74. *Crithopsis delileana* (Schult.) Roshev.

FIGURE 83

Crithopsis delileana (Schult.) Roshev., Zlaki SSSR 319. 1937.

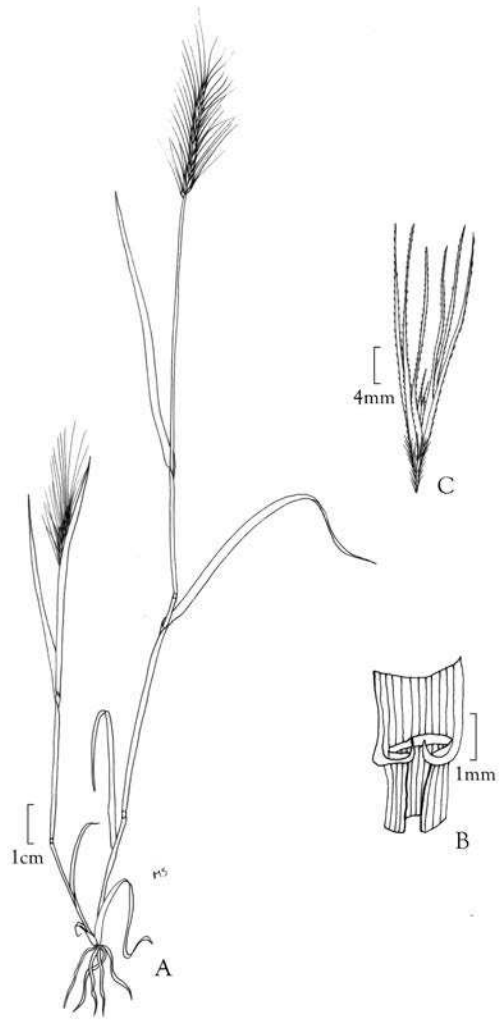


FIGURE 83. *Crithopsis delileana.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Schweinfurth s.n.* (CAI); B, C drawn from *J. Bornmuller 1723* (US-1127578).

Solitary annuals. Culms 10–30 cm tall, erect, geniculately ascending; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths strongly compressed, glabrous, margins smooth; oral hairs ciliate; auricles clawlike; ligules 1–2 mm long, membranous, apex entire; blades 2–10 cm long, 1–3 mm wide, linear, flat or involute, spreading, hairy on the basal ⅓, margins scabrous, base amplexicaul, apex acuminate. Spikes 2–3.5 cm long, single, oblong, bilateral; spikelets in pairs. Spikelets 12 mm long, lanceolate, dorsally compressed, falling entire; lemmas about 7 mm long, awns 5–7 mm long, straight. Habitat: damp sites and a weed of cultivation. Distribution: (Mm) E Mediterranean to Iran.

75. Cutandia dichotoma (Forssk.) Batt. & Trab.

FIGURE 84

Cutandia dichotoma (Forssk.) Batt. & Trab., Fl. Algérie Monocot. 237. 1895.
Common name: *khafoor*.

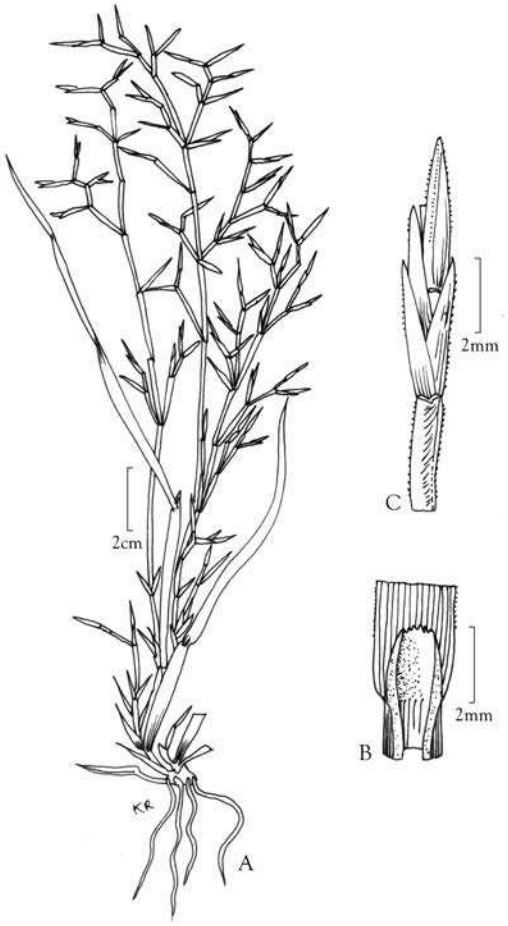


FIGURE 84. *Cutandia dichotoma.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *C. H. Davis 6561D* (K-H-2012/000899-7).

Mat-forming annuals. Culms 10–35 cm tall, erect, geniculate; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, strongly compressed, keeled, glabrous, ribbed, margins smooth; ligules 1–2 mm long, membranous, apex lacerate; blades 2–10 cm long, (0.5–)1–2 mm wide, linear, flat or conduplicate, ascending, glabrous, margins scabrous, apex acuminate. Panicles 2–8 cm long, open, lanceolate, dichotomously branched. Spikelets 6–11.5 mm long, 2–4-flowered, linear, laterally compressed; lemmas 4–5.5 mm long, awnless. Habitat: sandy soil. Distribution: (Mm, Ms, Nv, Di) N Africa and SW Asia.

76. Cutandia maritima (L.) Barbey

FIGURE 85

Cutandia maritima (L.) Barbey, Fl. Sard. Comp. 72. 1885.
Common name: *khafoor*.

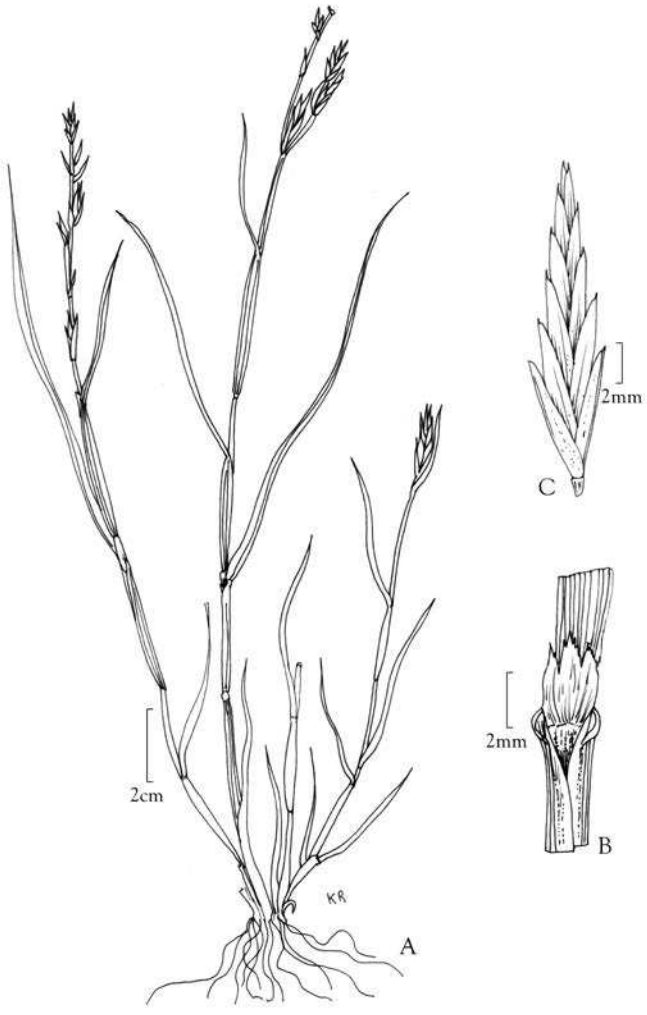


FIGURE 85. *Cutandia maritima.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Rhumer 381* (CAI); B drawn from *F. Lamson Scribner s.n.* (US-748520); C modified from Cope (2005).

Solitary annuals. Culms 10–35 cm tall, erect, geniculate; internodes and nodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, strongly compressed, keeled, glabrous, margins membranous; ligules 2–4 mm long, membranous, apex truncate, lacerate, acute; blades 2–10 cm long, 1–2 mm wide, deciduous at the ligules, linear, flat or filiform, ascending, glabrous, margins smooth, apex acuminate. Panicles 1.5–16 cm long, dichotomously branched, open, elliptic, secund, partly enclosed in the uppermost sheath. Spikelets 8–16(–22) mm long, 5–12-flowered, ovate, laterally compressed; lemmas 5.5–9.5 mm long, awnless. Habitat: coastal sand and waste places. Distribution: (Mm, Di) Mediterranean.

77. *Cutandia memphitica* (Spreng.) K. Richt.

FIGURE 86

Cutandia memphitica (Spreng.) K. Richt., Pl. Eur. 1: 77. 1890.
Common names: *sammah*; Memphis grass.

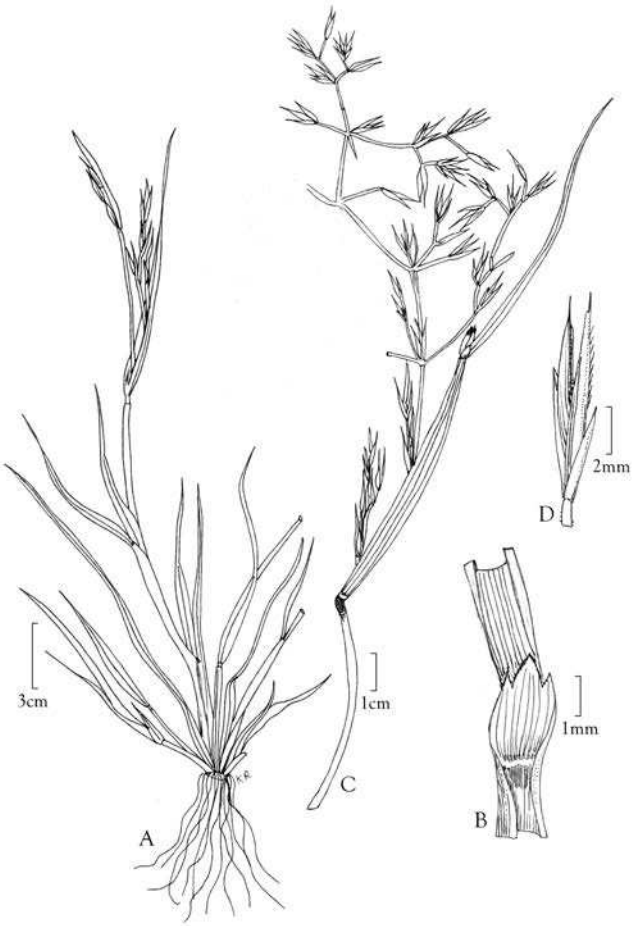


FIGURE 86. *Cutandia memphitica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *Shamso s.n.* (CAI); B–D drawn from *F. A. Barkley & H. Abbas 1098* (US-2381386), *A. Rawi s.n.* (US-2970919).

Caespitose annuals. Culms 10–30 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, strongly compressed or keeled, glabrous, margins membranous; ligules 2–3 mm long, membranous, apex lacerate, truncate; blades 2–8 cm long, 1–2 mm wide, deciduous at the ligules, linear, convolute or conduplicate, ascending, smooth or scaberulous, bases narrow, apex acute. Panicles 3–18 cm long, open, elliptic, dichotomously branched, enclosed in the uppermost sheath. Spikelets 4.5–5 mm long, 2–4-flowered, in pairs, laterally compressed; lemmas 7–8.5 mm long, awns 10–11 mm long, column twisted. Habitat: sandy or saline soils, cultivated. Distribution: (Mm, Ms, Nv, Dl, Di, Ol, On, S, Ge) Mediterranean to SW Asia.

78. *Cymbopogon citratus** (DC.) Stapf

FIGURE 87

*Cymbopogon citratus** (DC.) Stapf, Bull. Misc. Inform. Kew 1906: 322, 357. 1906.
Common names: *hashishet el lamoun*; lemon grass.

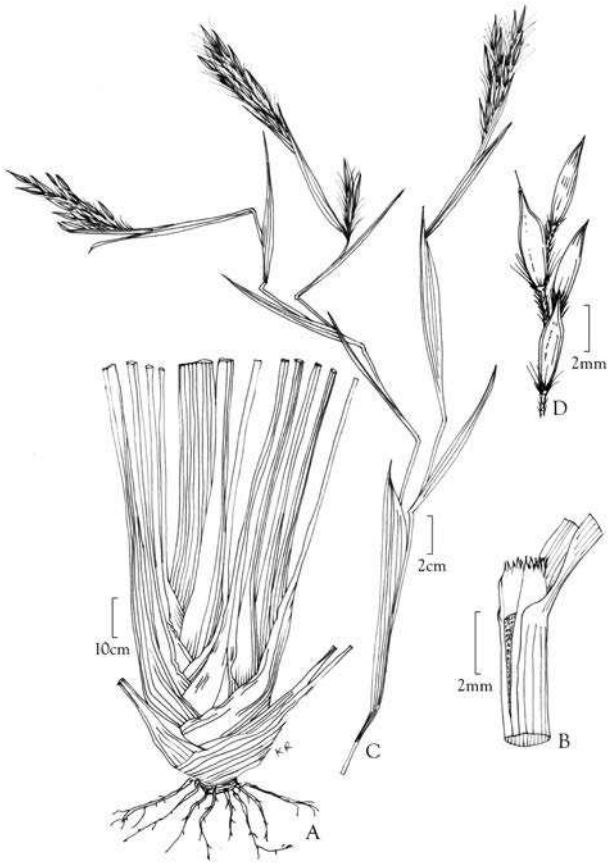


FIGURE 87. *Cymbopogon citratus.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets. A drawn from *M. Hassib s.n.* (CAI); B, C drawn from *E. C. Leonard & G. M. Leonard 12360a* (US-1454222); D modified from Barkworth (2003a).

Caespitose perennials, aromatic; rhizomes short. Culms 100–200 cm tall; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 1–3 mm long, membranous, apex erose; collars dark; blades 2–10 mm long, 1–2 mm wide, aromatic, linear, spreading, glabrous, margins scabrous, bases attenuate and broad to chordate, apex attenuate to spiny pungent. Panicles 30–60 cm long, composed of racemes, subtended by a spatheole, enclosed partially in the sheath. Spikelets 5–6 mm long, 0.7 mm wide, paired, lanceolate, laterally compressed; principal lemma awns 10–11 mm long, geniculate, twisted. Habitat: cultivated. Distribution: (Nn, Nv) tropics.

79. *Cymbopogon flexuosus** (Nees ex Steud.) Will. Watson

FIGURE 88

*Cymbopogon flexuosus** (Nees ex Steud.) Will. Watson, Himalayan Districts N.W. Prov. India 1: 392. 1882.
Common name: East Indian lemon grass.

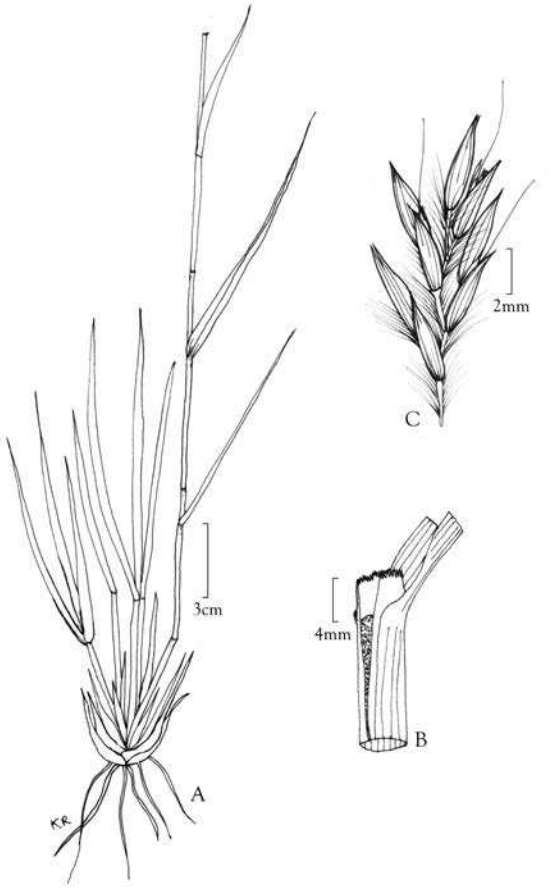


FIGURE 88. *Cymbopogon flexuosus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. A–C drawn from *E. M. Jarrett, C. Saldanda & T. P. Ramamoorthy HFP609* (US-2792143).

Caespitose perennials, aromatic; rhizomes short. Culms up to 300 cm tall, erect, straight; internodes glabrous; nodes bearded; butt sheaths curly, glabrous. Leaves basal and cauline; sheath surfaces glabrous, margins entire; oral hairs present; ligules 3–6 mm long, membranous; scarious, apex obtuse; blades 20–100 cm long, 5–15 mm, wide, aromatic, linear, flat, curly, spreading, hairy on the basal ⅓, margins scabrous, bases broad or cordate, apex attenuate. Panicles 30–60 cm long, erect, terminal, lax, terminal and axillary, subtended by a spatheole; spatheole 1–2 cm long, elliptic, partially included in sheaths. Spikelets 4.5–5 mm long, in pairs, dorsally compressed; principal lemma awns 10–11 mm long, column twisted. Habitat: cultivated. Distribution: (Nn, Nv) India.

80. *Cymbopogon iwarancusa** (Jones) Schult.

FIGURE 89

*Cymbopogon iwarancusa** (Jones) Schult., Mant. 2: 458. 1824. [*Cymbopogon jwarancusa* Schult.]
Common name: jwarancusa grass.

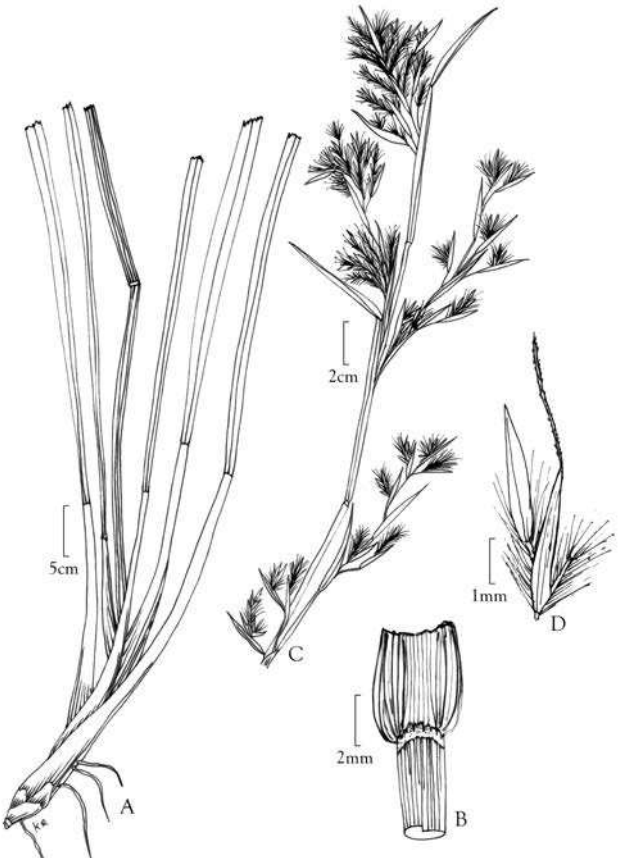


FIGURE 89. *Cymbopogon iwarancusa.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets. A, C, D drawn from *J. F. Duthie* (US-925672); B drawn from *J. F. Duthie 12922* (US-925673).

Caespitose perennials, aromatic; occasionally with short rhizomes. Culms 30–100 cm tall, erect, straight; internodes glabrous; butt sheaths curly, glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; ligules 1–3 mm long, ciliolate membranes; blades 10–30 cm long, 2–5 mm wide, aromatic, flat, linear or filiform, spreading, glabrous, margins scabrous, bases broad cordate, apex attenuate to spiny pungent. Panicles 15–40 cm long, erect, terminal and axillary, linear, dense, composed of racemes, subtended by spatheoles; spatheoles 1.5–2.5 cm long, lanceolate or elliptic; red, partially included in sheaths. Spikelets 4.5–5.5 mm long, in pairs, lanceolate, dorsally compressed; principal lemma awns 7–10 mm long, geniculate, column twisted. Habitat: cultivated. Distribution: (Nn, Nv) India and Pakistan.

81. *Cymbopogon martini** (Roxb.) Will. Watson

FIGURE 90

*Cymbopogon martini** (Roxb.) Will. Watson, Himalayan Districts N.W. Prov. India 10: 392. 1882.
Common names: palmarosa, rosha grass.

Caespitose perennials, aromatic. Culms up to 250 cm tall, erect; internodes straight, glabrous, butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; oral hairs present; ligules 1–3 mm long, membranous, apex lacerate; collars dark colored; blades 20–40 cm long, 10–30 cm wide, linear, flat, spreading, glabrous, margins scabrous, bases broad cordate or amplexicaul, apex attenuate. Panicles 15–30 cm long, erect, terminal, linear, dense, subtended by spatheoles, enclosed in the sheaths; spatheoles 2–4 cm long, red; racemes 1.5–2 cm long, usually with 2 deflexed. Spikelets 4–4.5 mm long, in pairs, oblong, dorsally compressed; principal lemma awns 12–18 mm long, geniculate, column twisted. Habitat: cultivated. Distribution: (Nn, Nv, O) India and Pakistan.

82. *Cymbopogon nardus* (L.) Rendle

FIGURE 91

Cymbopogon nardus (L.) Rendle, Cat. Afr. Pl. 2(1): 155. 1899.
Common names: *sumbul hindi*; citronella grass.

Caespitose perennials, aromatic. Culms up to 300 cm tall, erect; internodes glabrous; butt sheaths glabrous, persistent. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 3–9 mm long, membranous, apex lacerate; blades 10–50 cm long, 3–10 mm wide, flat, linear or filiform, aromatic, spreading, glabrous or scaberulous, margins scabrous, bases narrow, apex attenuate to spiny pungent. Panicles 15–60 cm long, compound, dense, subtended by spatheoles, enclosed in the sheath, racemes 15–60 cm long, erect. Spikelets 1–2.5 cm long, elliptic, in pairs, dorsally compressed; principal lemma awns 10–15 mm long, geniculate, column twisted. Habitat: cultivated, bushland and grasslands. Distribution: (Nn, Nv) Africa and India.

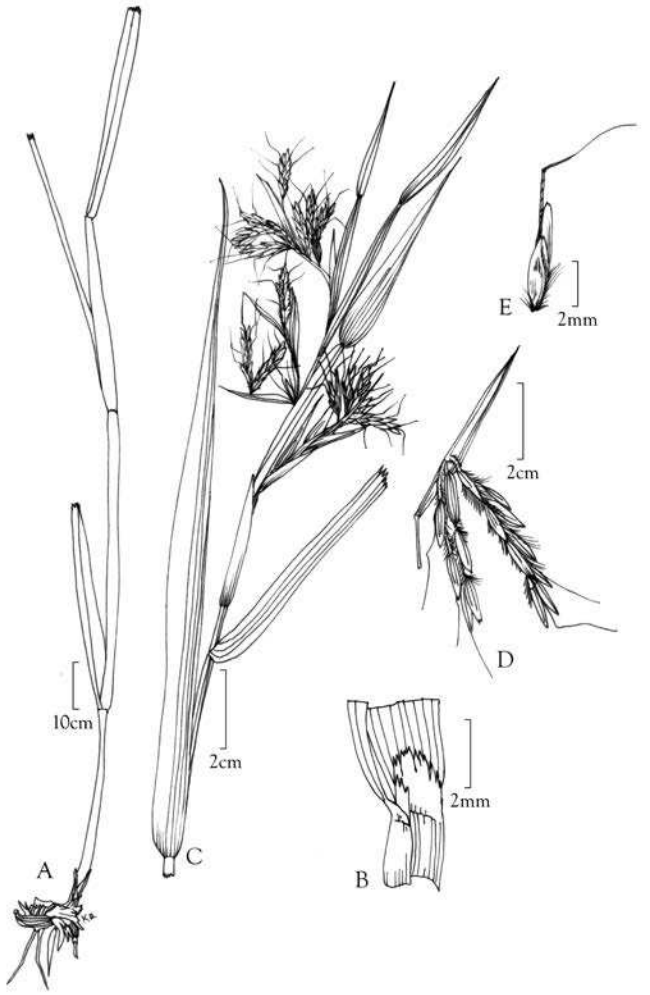


FIGURE 90. *Cymbopogon martini.* A. Habit. B. Ligule, sheath, and blade C. Inflorescence. D. Segment of inflorescence. E. Spikelet. A–E drawn from *G. Stati & C. C. Wisner 4* (US-1256939).

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

FIGURE 92

Cymbopogon schoenanthus (L.) Spreng., Pl. Min. Cogn. Pug. 2: 15. 1815.
Common names: *halfa-bar, hashma, wumbul hindi.*

Caespitose perennials; aromatic. Culms 30–80 cm tall, erect; internodes glabrous, glossy; nodes dark, bearded; butt sheaths glabrous, persistent. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 1–3 mm long, membranous, apex erose; blades 10–35 cm long, 1–4 mm wide, filiform, spreading, involute, scaberulous, margins scabrous, bases narrow, apex attenuate to spiny, pungent. Panicles 5–40 cm long, dense, composed of racemes 1–3 cm long, terminal and axillary, subtended by

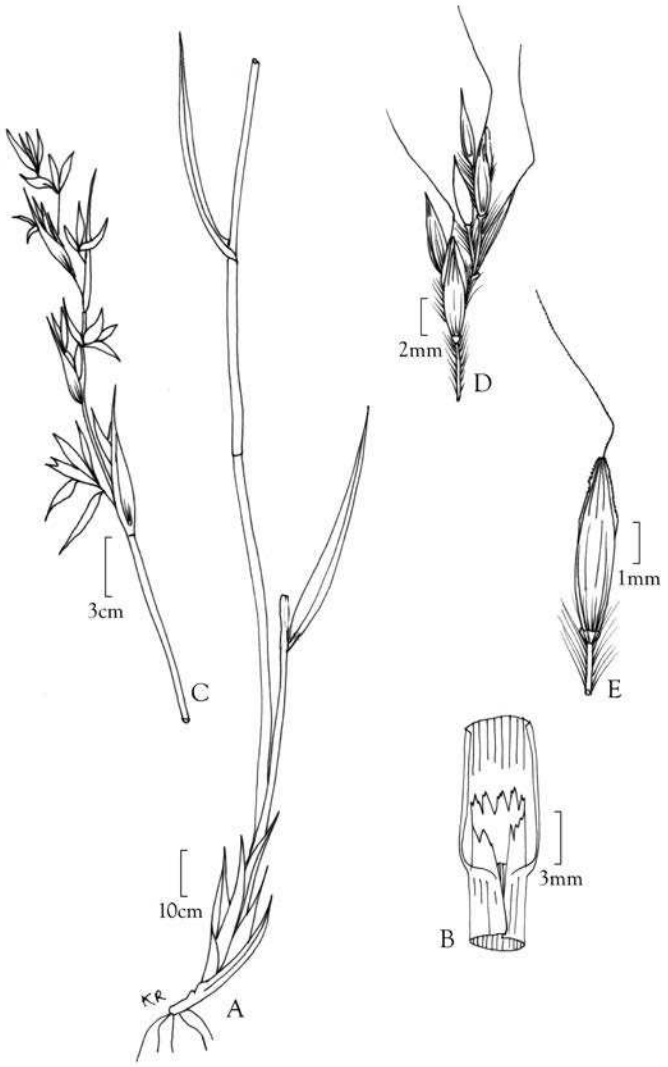


FIGURE 91. *Cymbopogon nardus*. A. Habit. B. Ligule, sheath, and blade C. Inflorescence. D. Segment of inflorescence. E. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D, E drawn from *G. Davidse 7701* (US-2885070), *R. D. Hoogland 11522* (US-261068).

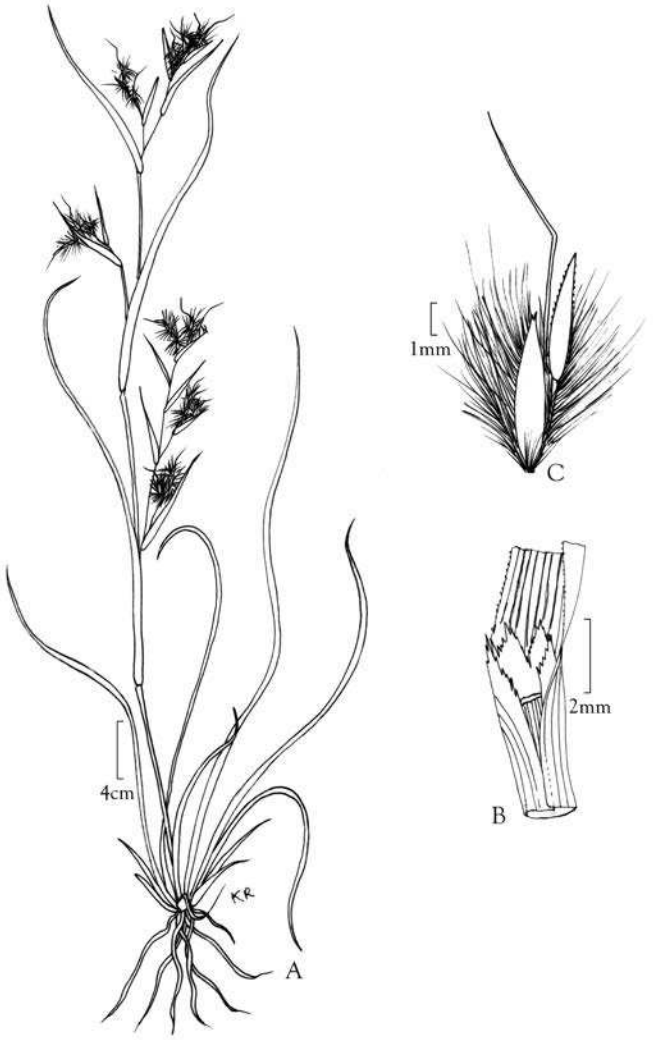


FIGURE 92. *Cymbopogon schoenanthus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A, C drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *Y. Hu 8328* (US-2722032).

a spatheole, enclosed in the sheath, paired, deflexed. Spikelets 4–7 mm long, in pairs, lanceolate, dorsally compressed; principal lemma awns 5–9 mm long, straight. Habitat: rocky slopes. Distribution: (Di, Ge) Sahara to Arabia.

KEY TO THE SUBSPECIES

1a. Racemes 2–3 cm long; spatheoles 2.3–3 cm long; lower glumes of sessile spikelets glabrous . . . . . ***C. schoenanthus* subsp. *schoenanthus***

1b. Racemes 1–2 cm long; spatheoles 1.3–2 cm long; lower glumes of sessile spikelets pubescent on the back . . . . . ***C. schoenanthus* subsp. *proximus* (Hochst ex A. Rich.) Maire & Weiller, Fl. Afrique N. 1: 287. 1952**

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

FIGURE 93

Cynodon dactylon (L.) Pers., Syn. Pl. 1: 85. 1805.
Common names: *erq el negiel, moddied, negil baladi*; Bermuda grass.

Mat-forming perennials; stolons present; rhizomes elongated. Culms 10–40 cm tall, erect; internodes glabrous, glossy; lower nodes rooting; butt sheaths glabrous, persistent. Leaves basal and cauline; sheaths longer than adjacent internodes, glabrous, ribbed, margins smooth; ligules 0.3 mm long, a ciliate membrane; oral hairs present; blades 3–15 cm long, 2–4 mm wide, linear or loosely convolute, spreading, scaberulous, glabrous or pilose, margins sparsely hairy and scabrous, apex acuminate. Racemes 1.5–6(–8) cm long, 4–6 digitately arranged branches, erect, unilateral. Spikelets 2–2.6 mm long, lanceolate, laterally compressed; lemmas silky pubescent on the keel, awnless. Habitat: sandy and rocky sites, along rivers, disturbed sites. Distribution: (Mm, Ms, Nv, Nn, Dl, Di, Ol, On, S, Ra, Ge) tropical and warm temperate regions, cosmopolitan.

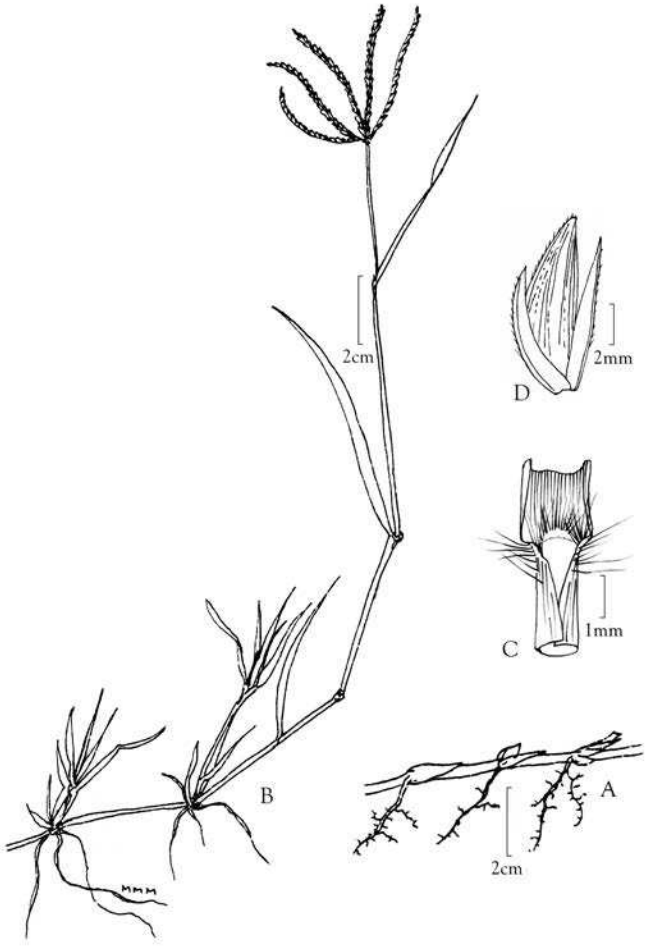


FIGURE 93. *Cynodon dactylon.* A. Stolon. B. Habit. C. Ligule, sheath, and blade. D. Spikelet. A, C drawn from *R. Kanal 432* (US-3279031); B modified from Ibrahim and Kabuye (1988); D modified from Hitchcock (1951).

85. *Cynodon transvaalensis* Burtt Davy

FIGURE 94

Cynodon transvaalensis Burtt Davy, Bull. Misc. Inform. Kew 1921: 281. 1921.

Mat-forming perennials; stolons present; rhizomes long. Culms 5–10 cm tall, weak, prostrate; internodes glabrous, glossy; nodes glabrous, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; ligules 0.3 mm long, a ciliate membrane; oral hairs



FIGURE 94. *Cynodon transvaalensis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A modified from Ibrahim and Kabuye (1988); B, C, D drawn from *J. D. Snowden 1311* (US-3048132).

present; blades 1–5 cm long, 0.5–2 mm wide, filiform or involute, glabrous or sparsely hairy, margins scabrous, bases narrow, apex acuminate. Racemes 0.7–1.5 cm long, 1–3(–4) digitate branches, unilateral. Spikelets 2.5 mm long, ovate, laterally compressed; lemma sparsely ciliate on the keel, awnless. Habitat: meadows, cultivated as a lawn grass. Distribution: (Mm, Ms, Nv, Nn, Dl, Di, Ol, On, S, Ra, Ge) tropical and S Africa.

86. *Cynosurus coloratus* Lehm. ex Nees

FIGURE 95

Cynosurus coloratus Lehm. ex Nees, Fl. Afr. Austral. Ill. 439. 1841.
Common name: dogstail grass.

Caespitose annuals. Culms 5–20 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; ligules 7–13 mm long, membranous, apex acute; blades 2–5 cm long, 1–2 mm wide, linear, flat, scaberulous, rough on both sides, margins scabrous, bases narrow, apex abruptly acute. Panicles 2–3 cm long, 1.5–3 cm wide, capitate, ovate, unilateral. Spikelets 6–7 mm long, in pairs, oblong, laterally compressed; lemmas 3.4–4 mm long, awns 15–20 mm long, straight, bristly. Habitat: calcareous sandy dunes. Distribution: (Mm) E Mediterranean region.

87. *Cynosurus echinatus* L.

FIGURE 96

Cynosurus echinatus L., Sp. Pl. 1: 72. 1753.
Common name: bristly dogstail grass.

Caespitose annuals. Culms 10–80 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; ligules 5–10 mm long, membranous, apex lacerate, obtuse; blades 5–10 cm long, 3–7 mm wide, linear, flat, spreading, surfaces and margins scabrous, bases narrow, apex acuminate. Panicles 1–8 cm long, 1–2 cm wide, capitate, oblong or ovate, unilateral. Spikelets 8–14 mm

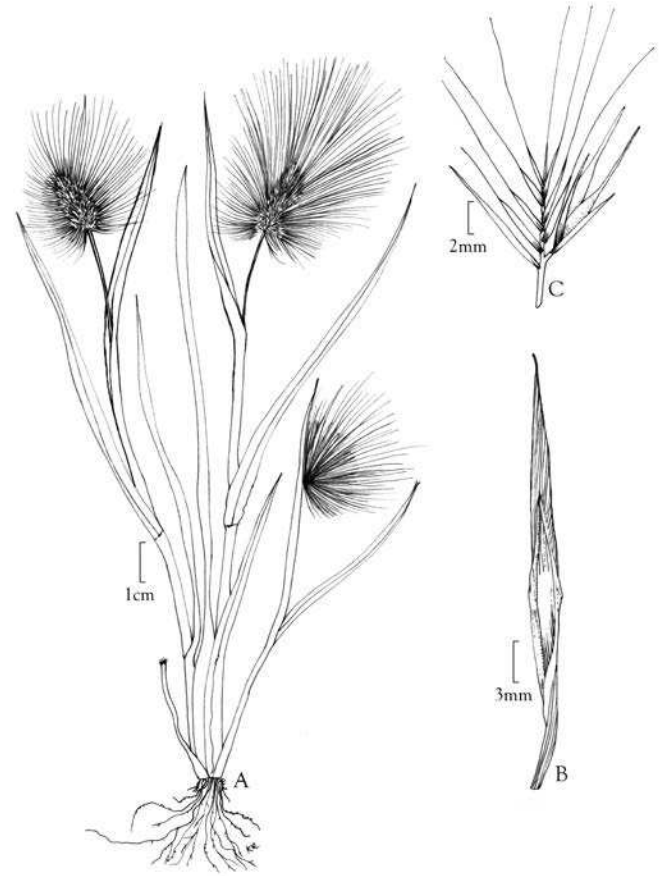


FIGURE 95. *Cynosurus coloratus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *L. Boulos 4378*; B, C drawn from *J. Bornmuller s.n.* (US-1109916).

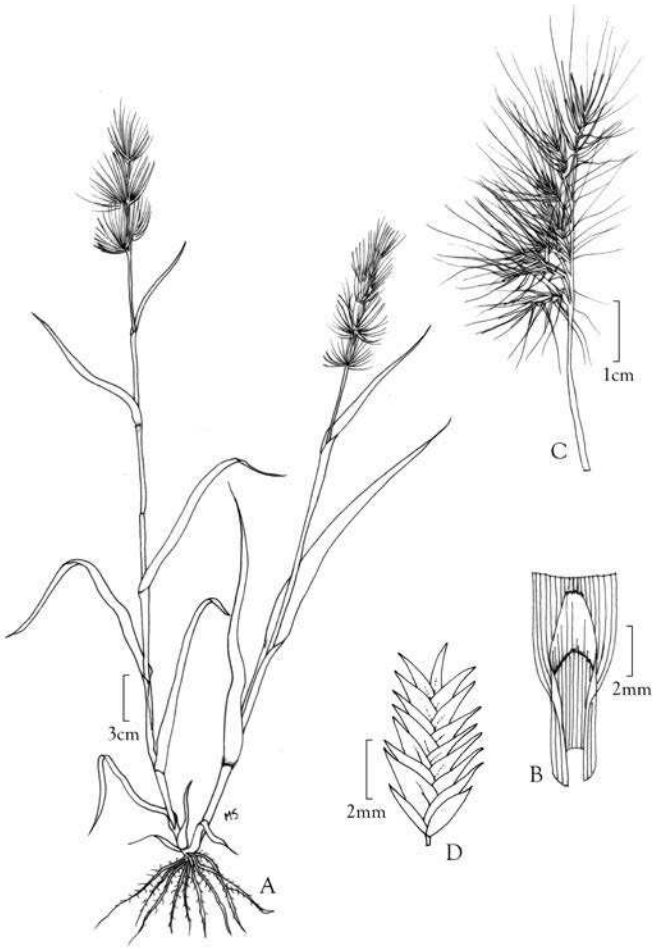


FIGURE 96. *Cynosurus echinatus*. A. Habit. B. Ligule, sheath, and blade. C. Segment of the inflorescence. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *A. C. Cook 458* (US-536631).

long, in pairs, cuneate, laterally compressed; lemmas 4–6.5 mm long, awns 6–16 mm long, straight, bristly. Habitat: calcareous sandy dunes. Distribution: (Mm) Mediterranean to C Asia.

88. *Dactylis glomerata* L.

FIGURE 97

Dactylis glomerata L., Sp. Pl. 1: 71. 1753.
Common names: cock's foot, orchard grass.

Caespitose coarse perennials. Culms 10–100 cm tall, erect, geniculate; internodes glabrous; butt sheaths sparsely hairy. Leaves basal and cauline; sheaths keeled, glabrous, margins smooth; ligules 6–10 mm long, decurrent, membranous, apex pointed and lacerate; blades 10–30 cm long, 2–10 mm wide, linear, flat or conduplicate, spreading, glabrous, margins scabrous, bases narrow, apex acuminate. Panicles 2–30 cm long, 1-sided, compressed, ellipsoid, contracted, ovate, interrupted, secund. Spikelets 5–9 mm long, oblong or cuneate, laterally compressed; lemmas 4–8 mm long, awns 0.5–1.5 mm long. Habitat: rocky slopes. Distribution: (Nv) Europe and temperate Asia.

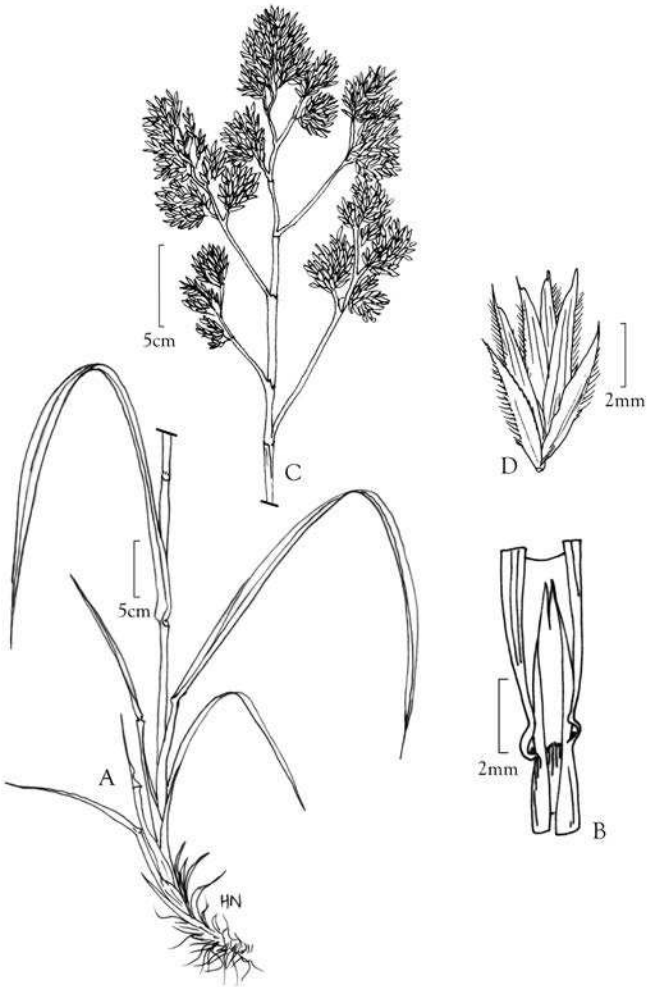


FIGURE 97. *Dactylis glomerata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *R. Kanal 546* (US-3208293); D modified from Hitchcock (1951).

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

FIGURE 98

Dactyloctenium aegyptium (L.) Willd., Enum. Pl. 2: 1029. 1809.
Common names: *na'eem el-saleeb, rigl er-hirbaya*; crowfoot grass.

Mat-forming or caespitose annuals; stolons present. Culms 10–50 cm tall, erect, geniculate; internodes glabrous; lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, margins smooth; ligules 1–3 mm long, membranous; blades 3–20 cm long, 25–50 mm wide, linear; flat, ascending, scabrous, margins ciliate with bulbous-based hairs, apex acuminate. Inflorescences with 3–9 digitately

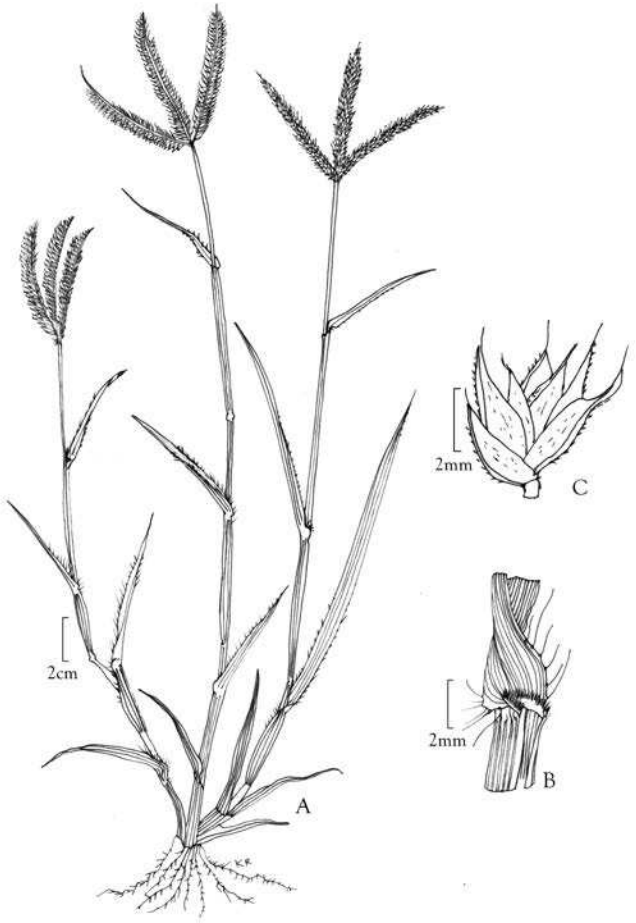


FIGURE 98. *Dactyloctenium aegyptium.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B drawn from *S. Laegaard 16166B* (US-3292800); C modified from Hatch (2003).

arranged, unilateral racemes 1.2–6.5 cm long, spreading or ascending. Spikelets 3.5–4.5 mm long, laterally compressed; upper glumes 1.5–2.2 mm long with a terminal, flexuous awn, the awn 0.8–4 mm long; lemmas 2.6–4 mm long, mucronate. Habitat: weed of cultivation, roadsides, and grasslands. Distribution: (Mm, Ms, Nv, Nn, Dl, Di, Dg, Ol, On, S) tropical and warm temperate Old World.

90. *Dactyloctenium aristatum* Link

FIGURE 99

Dactyloctenium aristatum Link, Hort. Berol. 1: 59. 1827.

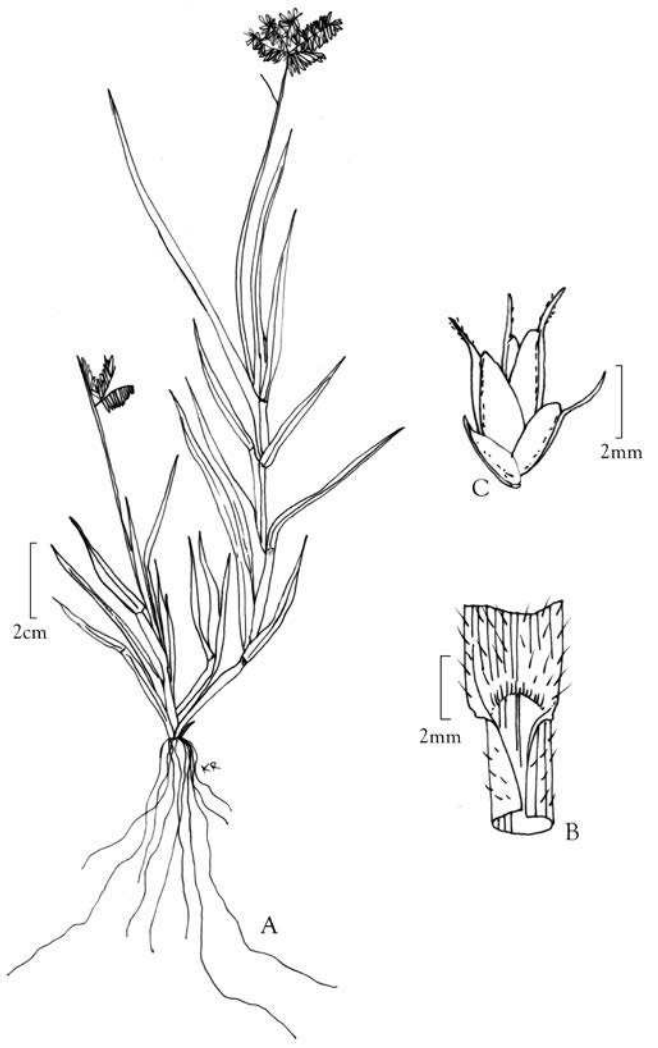


FIGURE 99. *Dactyloctenium aristatum*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C modified from Ibrahim and Kabuye (1988), *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Zahran 1105* (CAI); B drawn from *Lavranos & Carter 23128* (US-3595101).

Mat-forming annuals. Culms 5–30 cm tall, erect, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, ribbed, margins membranous; oral hairs present, with bulbous bases; ligules 1–3 mm long, a ciliate membrane; blades 1–10 cm long, 2.5–5.0 mm, hairy with bulbous-based hairs, linear, flat or conduplicate, ascending, margins tuberculate-ciliate, apex acuminate. Inflorescences with (2–)4–7(–11) digitately arranged, unilateral racemes 0.8–1.8 cm long. Spikelets 4.1–5.2 mm long, ovate, laterally compressed; upper glumes 1–2.3 mm long with a terminal, flexuous awn; lemmas 3–4.3 mm long, often mucronate. Habitat: coastal saline sand. Distribution: (Ge) E Africa, Arabia to NW India.

91. *Dactyloctenium scindicum* Boiss.

FIGURE 100

Dactyloctenium scindicum Boiss., Diagn. Pl. Orient., ser. 2, 4: 131. 1859.
Common name: *okunish*.

Mat-forming perennials; stolons present. Culms 10–40 cm tall, weak, erect, ribbed, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths pubescent, forming bulbous bases. Leaves basal and cauline; sheaths open, sparsely hairy, margins smooth; oral hairs present; ligules 1–3 mm long, ciliolate membranes; blades 1–10 cm long, 1–2 mm wide, linear, flat or conduplicate, glaucous, ascending, hairy, margins tuberculate-ciliate, apex attenuate. Inflorescences with 3–4(–5) digitately arranged, unilateral racemes 0.8–2 cm long. Spikelets 4–8 mm long, lanceolate or ovate, laterally compressed; upper glumes 1–2.3 mm long with a terminal awn; lemmas 3–3.8 mm long, mucronate. Habitat: sandy soils. Distribution: (Dn, Ra, Ge) NE Africa through Arabia to NW India.

92. *Danthoniopsis barbata* (Nees) C. E. Hubb.

FIGURE 101

Danthoniopsis barbata (Nees) C. E. Hubb., Bull. Misc. Inform. Kew 1934: 435. 1934.
Common name: *tebbis*.

Caespitose annuals; rhizomes elongated, knotty. Culms 30–40 cm tall, erect, geniculate; internodes hirsute; nodes bearded; butt sheaths glabrous. Leaves basal, cauline, distichous; sheaths sparsely hairy, margins scabrous; oral hairs present; ligules a fringe of hairs; blades 3–20 cm long, 2.5–10 mm wide, lanceolate, flat, ascending, glabrous or pilose, margins cartilaginous, scabrous, apex spiny pungent. Panicles 4–18 cm long, open or contracted, oblong. Spikelets 9–11 mm long, in threes, lanceolate, laterally compressed; fertile lemmas 6–12 mm long, awns 16–18 mm long, geniculate, column twisted. Habitat: rocky slopes. Distribution: (Ge) NE Africa and Arabia.

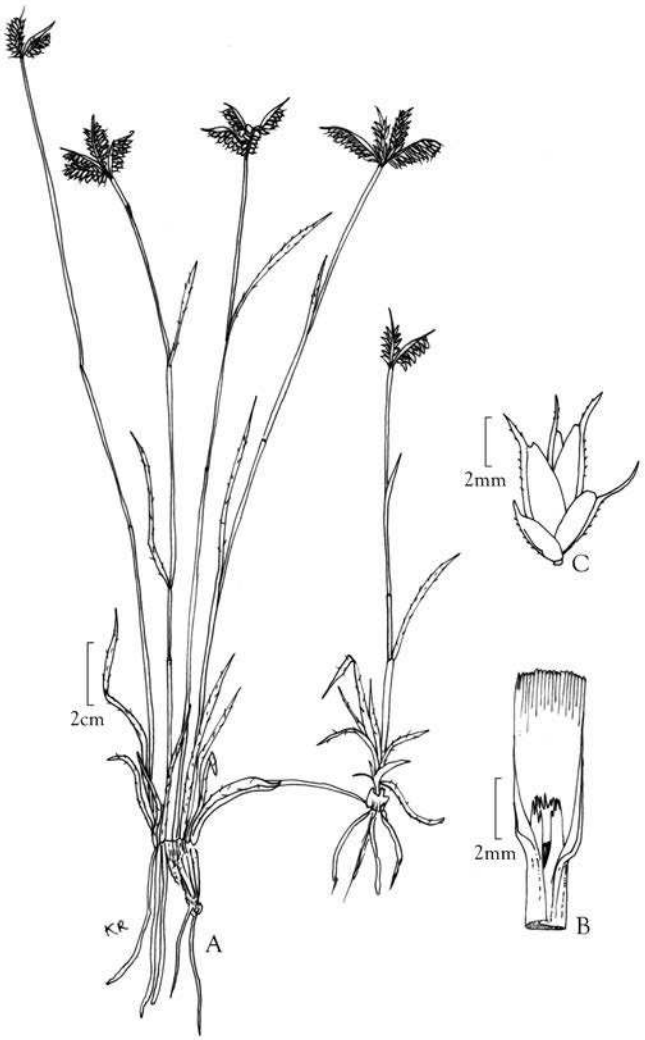


FIGURE 100. *Dactyloctenium scindicum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Kassas 741* (CAI); B drawn from *Greenway & Kanari* (US-3568512); C modified from Ibrahim and Kabuye (1988).

93. *Desmazeria philistaea* subsp. *rohlfsiana* (Coss.) H. Scholz

FIGURE 102

Desmazeria philistaea subsp. *rohlfsiana* (Coss.) H. Scholz, Willdenowia 6(2): 291. 1971.
Common name: *halfa*.

Caespitose annuals; occasionally with short rhizomes. Culms 10–25 cm tall, erect, purplish; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; ligules 1–3 mm long, membranous, apex erose, lacerate; blades 3–8 cm long, 1–3 mm wide, linear, flat, flaccid, spreading, ribbed, glabrous, margins smooth, apex abruptly acute. Panicles 1.5–8 cm long, open, oblong or ovate; branches 1 per node, usually with 3 spikelets. Spikelets 6–28 mm long, 3–5 mm wide, elliptic or oblong, laterally compressed; lemmas 3.5–4 mm long, awnless. Habitat: sand dunes and limestone-derived soils. Distribution: (Mm) N Africa to Palestine.

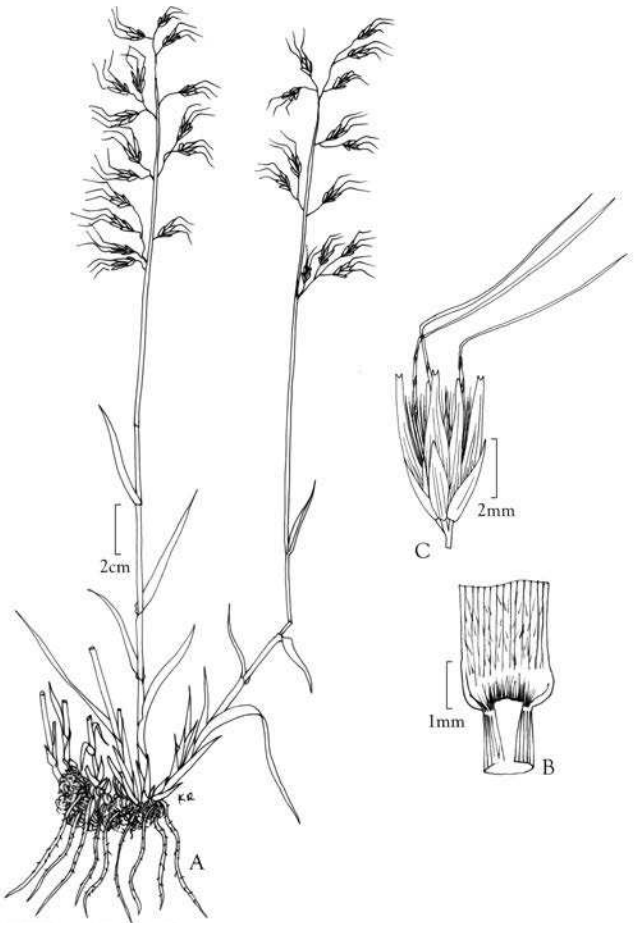


FIGURE 101. *Danthoniopsis barbata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Zahran 732* (CAI); B, C drawn from *W. Schimper 788* (US-1127169).

94. *Desmostachya bipinnata* (L.) Stapf

FIGURE 103

Desmostachya bipinnata (L.) Stapf, Fl. Cap. 7: 632. 1900.
Common name: *halfa*.

Caespitose perennials; rhizomes elongated, scaly, flabellate. Culms up to 200 cm tall, solid, erect; internodes rough; basal

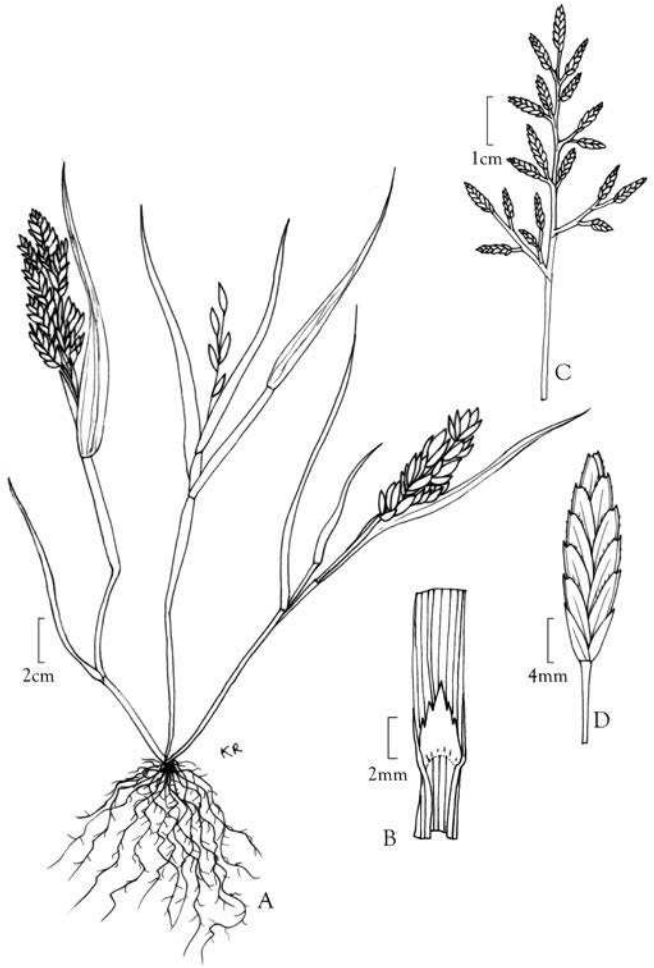


FIGURE 102. *Desmazeria philistaea.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *A. Eig* (US-1723166), *Inbrun s.n.* (US-1723166); D drawn from *T. Cope, G. Fahmy, I. E. Garf 238* (CAI).

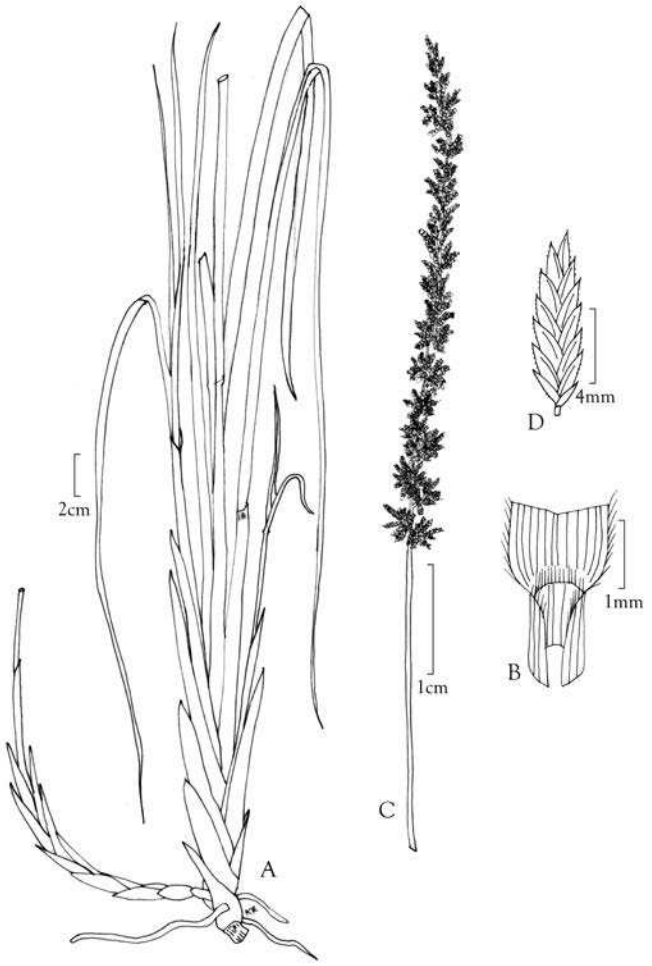


FIGURE 103. *Desmostachya bipinnata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *Chria Mascu s.n.* (CAI); B, C drawn from *F. R. Fosberg 56909* (US-2832090); D modified from Cope (2005).

innovations intravaginal; butt sheaths scarious or glabrous, pallid or dark brown. Leaves basal and cauline; sheaths open, glabrous, margins hairy; oral hairs present; ligules 1 mm long, a ciliolate membrane; blades 10–50 cm long, 3–6 mm wide, linear; flat or convolute, ascending, coriaceous, ribbed, hairy, margins scabrous, apex attenuate or spiny pungent. Inflorescences up to 60 cm long, erect, terminal, composed of numerous racemes borne along a central axis; racemes 15–40 cm long. Spikelets 2.5–13 mm long, oblong, laterally compressed; lemmas 1.8–2.7 mm long, awnless. Habitat: along streams, springs, weed of cultivation, and waste places. Distribution: (Ms, Nv, Nn, Dl, Dg, Dn, Di, Ol, On) Old World tropics.

95. *Dichanthium annulatum* (Forssk.) Stapf

FIGURE 104

Dichanthium annulatum (Forssk.) Stapf, Fl. Trop. Afr. 9: 178. 1917. Common names: *abu qoseiba, hmera,* humeira, *nigeil farsi, rokeeba, sayfoun*; Delhi grass, marvel grass.

Caespitose perennials. Culms 20–100 cm tall, decumbent; internodes hirsute; nodes conspicuously bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, striate, margins hairy; oral hairs present; ligules 3–6 mm long, membranous, apex obtuse; blades 3–30 cm long, 2–6 mm wide, linear,

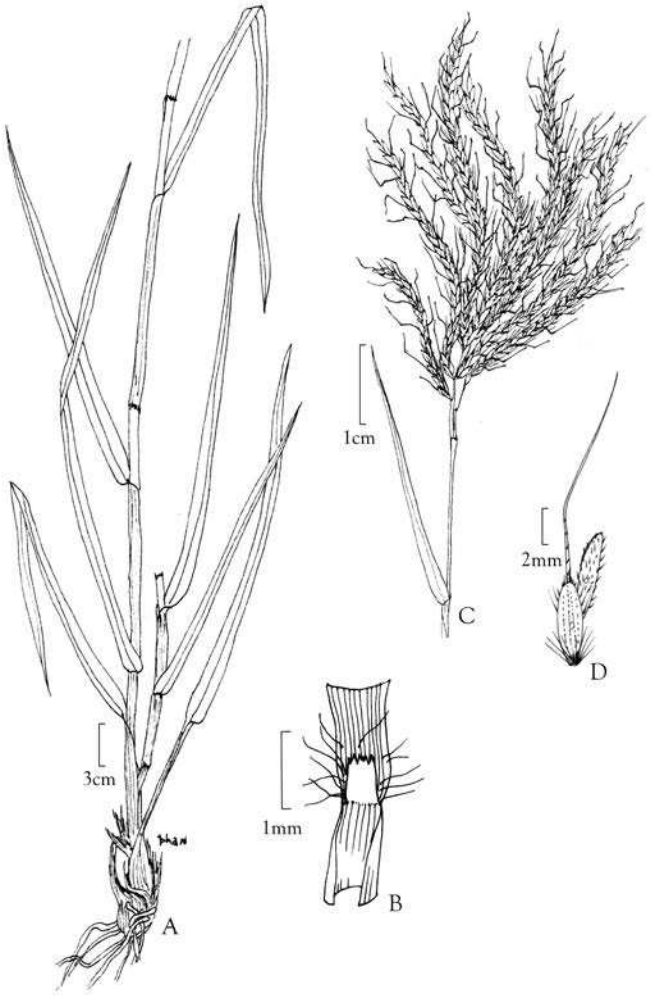


FIGURE 104. *Dichanthium annulatum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *F. R. Fosberg 56909* (US-2832090).

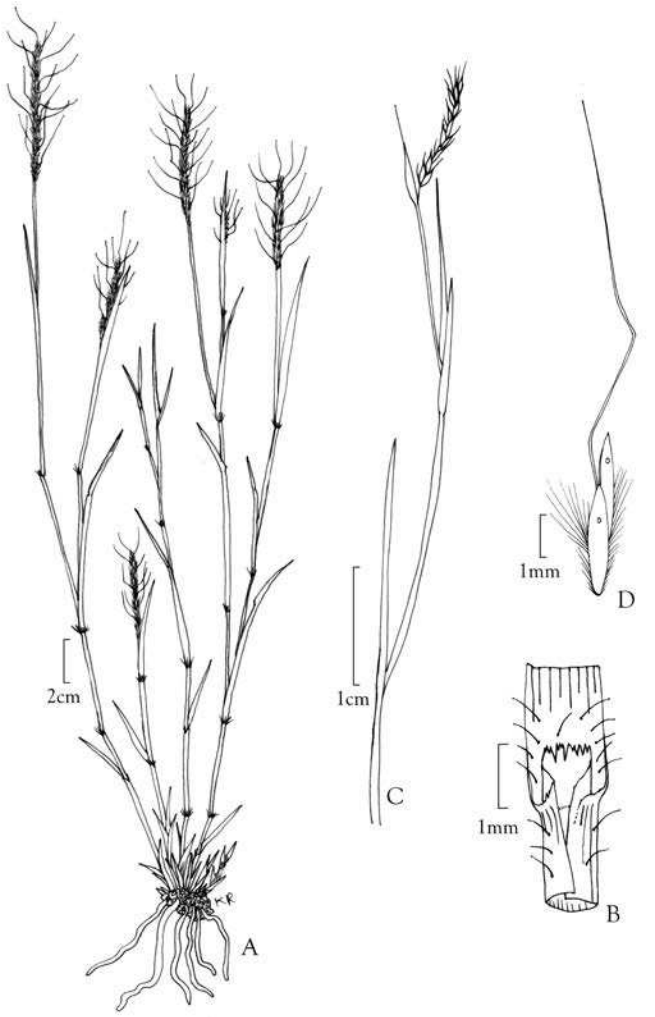


FIGURE 105. *Dichanthium foveolatum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets. A drawn from *V. Täckholm 1606* (CAI); B–D drawn from *W. Zeller 402* (US-3213846).

flat; ascending to appressed, upper surfaces pilose, margins cartilaginous, bases cordate, apex acuminate. Inflorescence composed of (1–)2–15 subdigitately arranged racemes; racemes 3–7 cm long. Spikelets 2–6 mm long, in pairs, oblong, dorsally compressed; lower glume of sessile spikelet not pitted; principal lemma awns 8–25 mm long, column twisted. Habitat: well-developed soils, weed of cultivation, and waste places. Distribution: (Mm, Nv, Nn, Dn, Di, Ol, On, S) tropical Africa and Indonesia.

96. *Dichanthium foveolatum* (Delile) Roberty

FIGURE 105

Dichanthium foveolatum (Delile) Roberty, Boissiera 9: 170. 1960.

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

97. *Digitaria ciliaris** (Retz.) Koeler

FIGURE 106

*Digitaria ciliaris** (Retz.) Koeler, Descr. Gram. 27. 1802.
Common names: *dafra*; white-haired rosette grass.

Caespitose annuals. Culms 10–80 cm tall, decumbent; internodes glabrous, tough; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths pubescent, margins smooth; oral hairs present; ligules 1–3 mm long, membranous, apex obtuse, lacerate; blades 3–20 cm long, 3–8 mm wide, linear, flat, ascending, glabrous, margins wavy, smooth, apex acuminate. Inflorescence composed of 2–12 digitately or subdigitately arranged unilateral racemes; racemes 6–22 cm long. Spikelets (2–)2.5–3.3(–3.7) mm long, in pairs, elliptic, dorsally compressed, apex acute; lemmas awnless. Habitat: waste places. Distribution: (Ms, Nv, Nn, Ol, Ra) tropics.

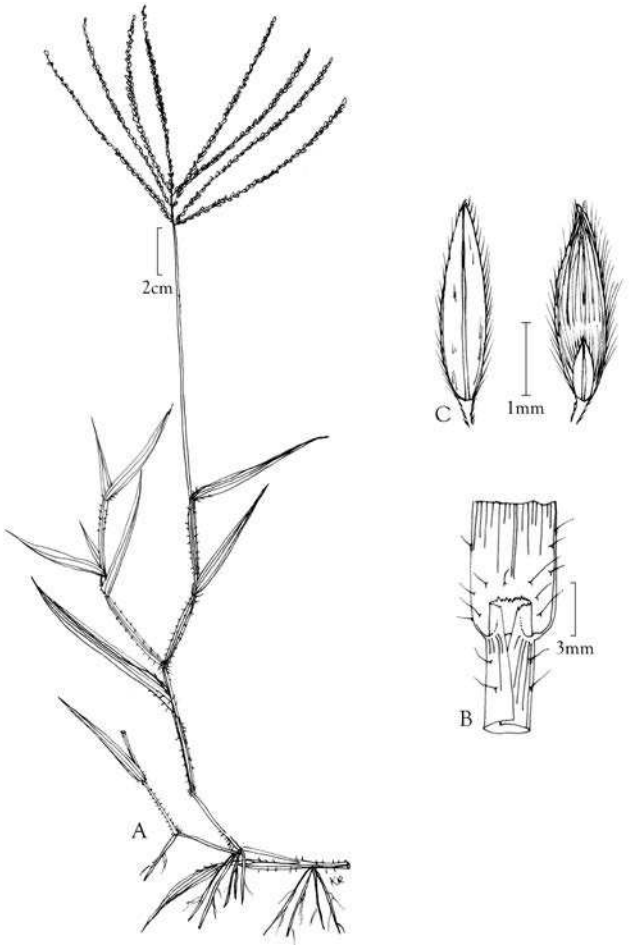


FIGURE 106. *Digitaria ciliaris.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower (left) and upper (right) glumes. A drawn from *S. Soliman s.n* (CAI); B, C drawn from *S. Lægaard & S. Traore s.n.* (US-3595166).

98. *Digitaria nodosa* Parl.

FIGURE 107

Digitaria nodosa Parl., Pl. Nov. 39. 1842.
Common name: *dafra*.

Solitary perennials. Culms 10–90 cm tall, weak, wiry, geniculate; internodes glabrous, ridged; nodes glabrous, often lower nodes rooting; butt sheaths pubescent, swollen at base. Leaves basal and cauline; sheaths hairy, margins hairy; oral hairs present; ligules1–3 mm long, membranous, apex lacerate; blades 3–25 cm long, 2–4 mm wide, linear flat, ascending, sparsely hairy, margins scabrous, apex attenuate. Inflorescence composed of 4–12(–25) unilateral racemes, digitately inserted or borne along a central axis; racemes 3–15 cm long. Spikelets 2–3 mm long, in pairs, elliptic, dorsally compressed; lemmas awnless.

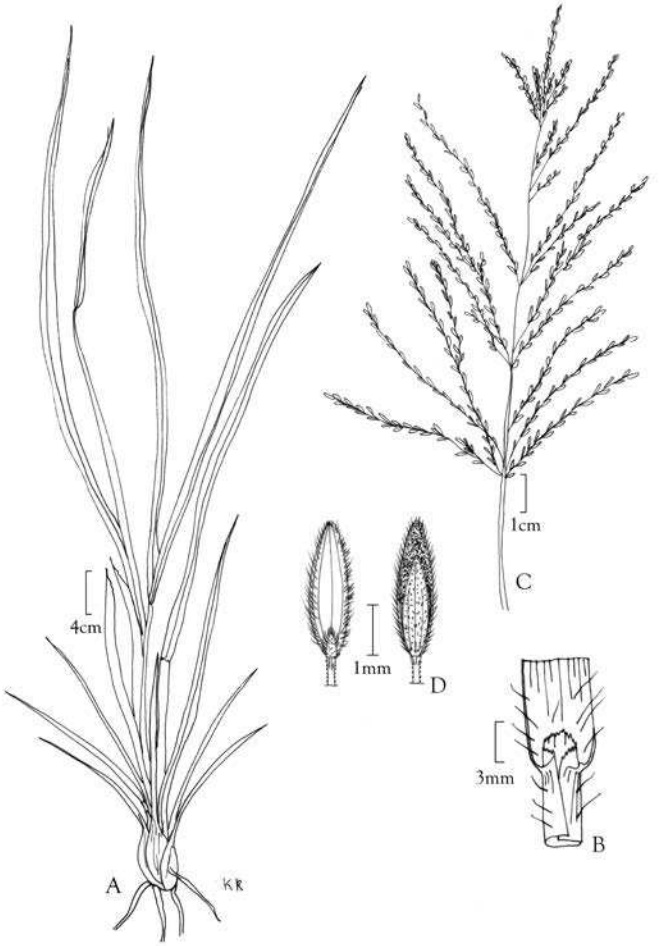


FIGURE 107. *Digitaria nodosa.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with lower (right) and upper (left) glumes. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *T. R. Soderstorm 1509* (US-2899815).

Habitat: rocky places. Distribution: (Ge) N and NE Africa to Arabia and Pakistan.

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

FIGURE 108

*Digitaria sanguinalis** (L.) Scop., Fl. Carniol., ed. 2, 1: 52. 1772.
Common names: *abu qu'sseyba, abu rokeba*; crabgrass, hairy crabgrass.

Caespitose annuals. Culms 10–50 cm tall, erect, geniculate; internodes glabrous, ridged; nodes bearded or glabrous, dark, lower nodes rooting; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths hairy, margins smooth; oral hairs present; ligules 2–3 mm long membranous, apex erose; blades 3–10 cm long, 2–7 mm wide, linear, flat, flaccid, spreading, sparsely hairy, margins smooth, apex acuminate. Inflorescence composed of 4–10 digitately inserted, unilateral racemes; racemes 4–18 cm long, the rachis narrowly winged, angular. Spikelets 2.5–3.3 mm long, in pairs, appressed, elliptic, dorsally compressed, apex acute; lemmas awnless. Habitat: waste places, introduced. Distribution: (Mm, Ms, Nv, Nn, Di, Ol) warm temperate regions.

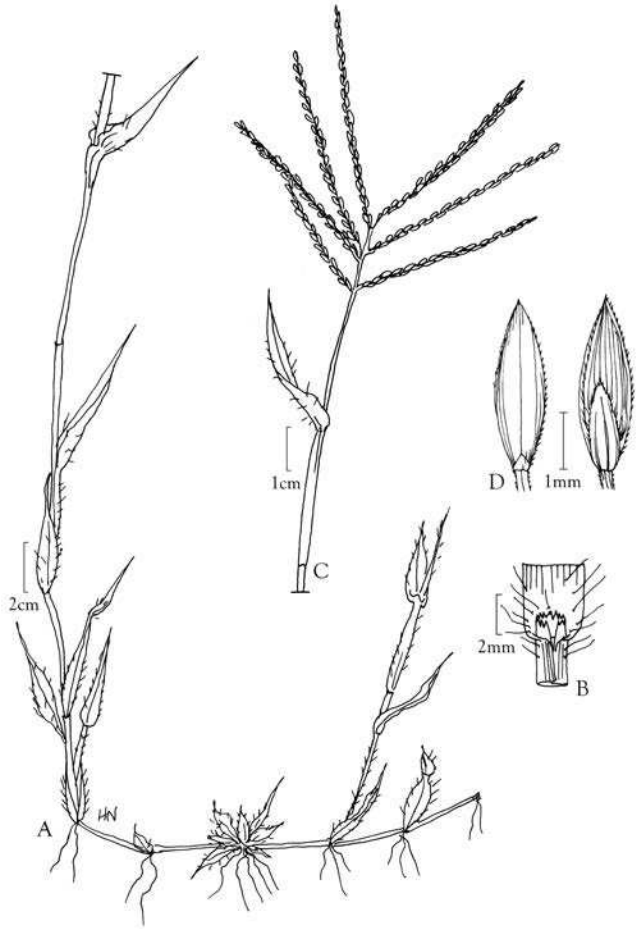


FIGURE 108. *Digitaria sanguinalis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with lower (left) and upper (right) glume. A, C drawn from *A. Chase 12706* (US-3110861); B drawn from *G. Schweinfurth s.n.* (US-823658); D modified from Hitchcock (1951).

100. *Digitaria velutina* (Forssk.) P. Beauv.

FIGURE 109

Digitaria velutina (Forssk.) P. Beauv., Ess. Agrostogr. 51, 173. 1812.
Common name: *eilaab*.

Solitary annuals; stolons present. Culms 20–70 cm tall, erect, geniculate; internodes semiterete, glabrous, ridged; nodes dark, bearded; butt sheaths scarious, sparsely hairy. Leaves basal and cauline; sheaths pubescent, ribbed, margins membranous,

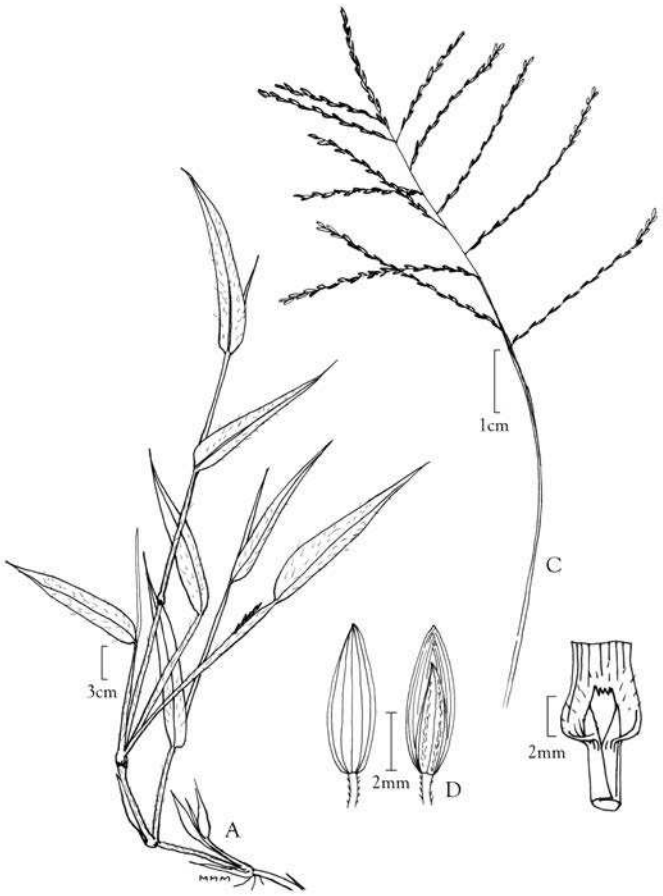


FIGURE 109. *Digitaria velutina.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with lower (left) and upper (right) glumes. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *R. N. Hale 109* (US-2241866).

hairy; oral hairs present; ligules 1–3 mm long, membranous, apex obtuse; blades 1.5–15 cm long, 3–15 mm wide, lanceolate, flat, flaccid, spreading, glabrous, margins smooth, bases cordate, apex acuminate. Inflorescence composed of (3–)7–20 unilateral racemes borne digitately or along a central axis; racemes 3–13 cm long. Spikelets 1.5–2.1 mm long, in pairs, elliptic, dorsally compressed, apex subacute; lemmas awnless. Habitat: sandy soils. Distribution: (Ge) NE and E southern Africa.

101. *Digitaria violascens** Link

FIGURE 110

*Digitaria violascens** Link, Hort. Berol. 1: 229. 1827.

Mat-forming annuals. Culms 10–55 cm tall, erect, geniculate, glabrous; internodes glabrous, ridged; nodes dark, lower rooting; butt sheaths coriaceous, glabrous. Leaves basal and cauline; sheaths open, glabrous, ribbed; ligules 1–3 mm long, membranous, apex erose; blades 3–20 cm long, 2–6 mm wide, lanceolate, glaucous, flat, scabrous, margins scabrous, apex acuminate. Inflorescence composed of (2–)3–6(–9) digitately borne, unilateral racemes; racemes 3–14 cm long. Spikelets 1.2–2 mm long, in pairs, dorsally compressed; lemmas awnless. Habitat: introduced. Distribution: (Nn) tropical Asia and tropical America.

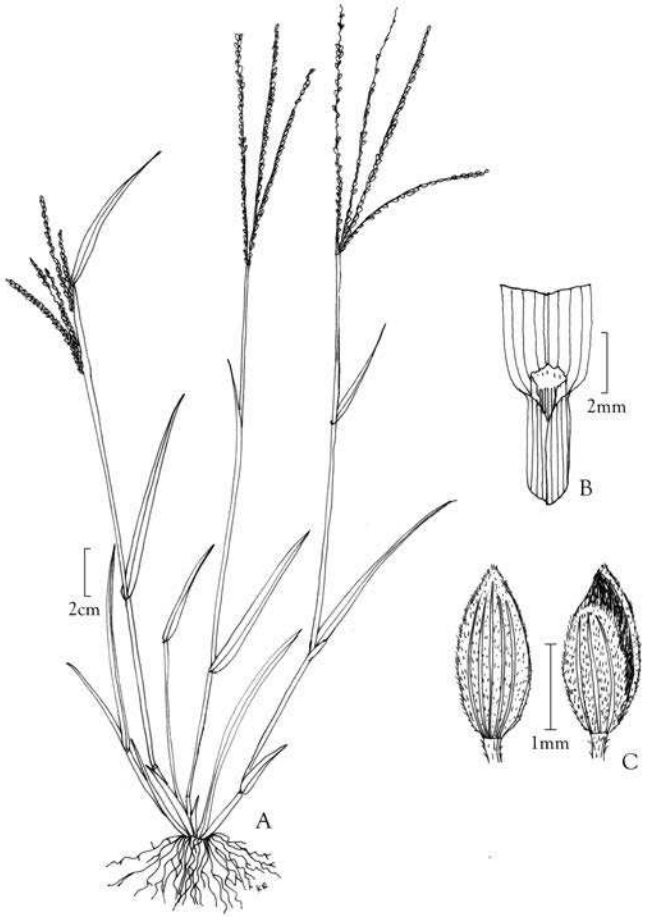


FIGURE 110. *Digitaria violascens.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower (left) and upper (right) glumes. A drawn from *Boulos s.n.* (CAI); B drawn from *A. Pappi s.n.* (US-1984285); C modified from Wipff (2003a).

102. *Dinebra panicea* (Retz.) P. M. Peterson & N. Snow

FIGURE 111

Dinebra panicea (Retz.) P. M. Peterson & N. Snow, Ann. Bot. (Oxford), n.s., 109: 1326. 2012. [*Leptochloa panicea* (Retz.) Ohwi; *Poa panicea* Retz.]

Common name: mucronate sprangletop.

Caespitose annuals. Culms up to 100 cm tall, erect, geniculate; internodes glabrous; nodes rooting below; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, open, ribbed,

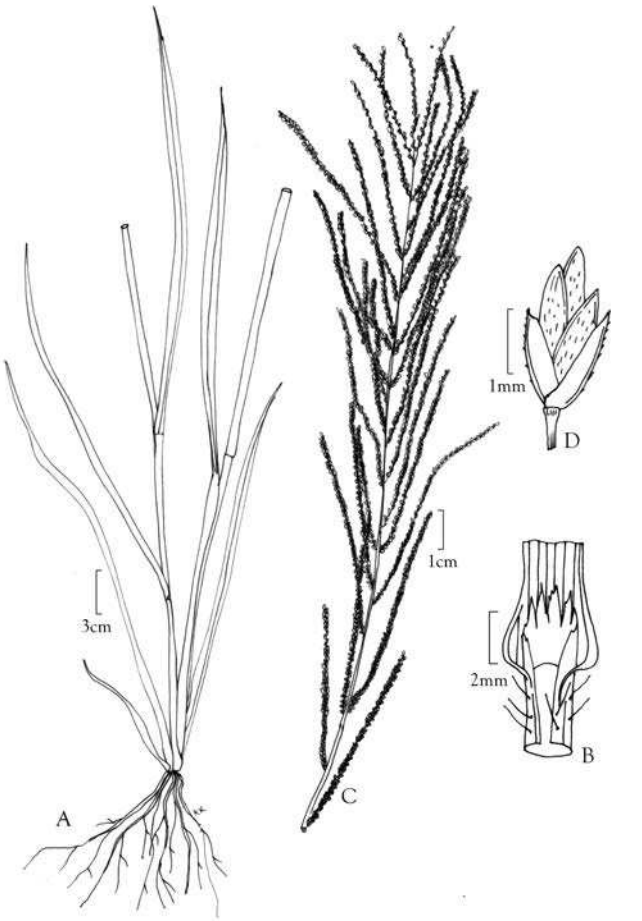


FIGURE 111. *Dinebra panicea.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *A. Amer 6313* (CAI); B–D drawn from *H. Faulkner 363* (US-1984377).

glabrous, margins smooth; collars hairy, dark colored; ligules 1–1.5 mm long, membranous, apex lacerate; blades 3–20 cm long, 2–5 mm wide, linear, revolute, spreading, flaccid, pilose or sparsely hairy, the hairs tubercle based, margins smooth, apex attenuate. Inflorescences 20–30 cm long, rachis semiterete; racemes 4–11 cm long, numerous, borne along a central axis. Spikelets 1.9–2.5 mm long, elliptic, laterally compressed, packed broadside to rachis, 2-rowed; lemmas 0.8–1.2 mm long, awnless. Habitat: alluvial soils. Distribution: (Nv) tropical Africa and Asia.

103. *Dinebra retroflexa* (Vahl) Panz.

FIGURE 112

Dinebra retroflexa (Vahl) Panz., Ideen Revis. Gräs. 20. 1813; Denkschr. Königl. Akad. Wiss. München 4: 270. 1814.
Common names: *deneib, negeil el-nimr*.

Loosely caespitose annuals. Culms 15–100 cm tall, erect, geniculate; internodes glabrous; butt sheaths scarious; glabrous.

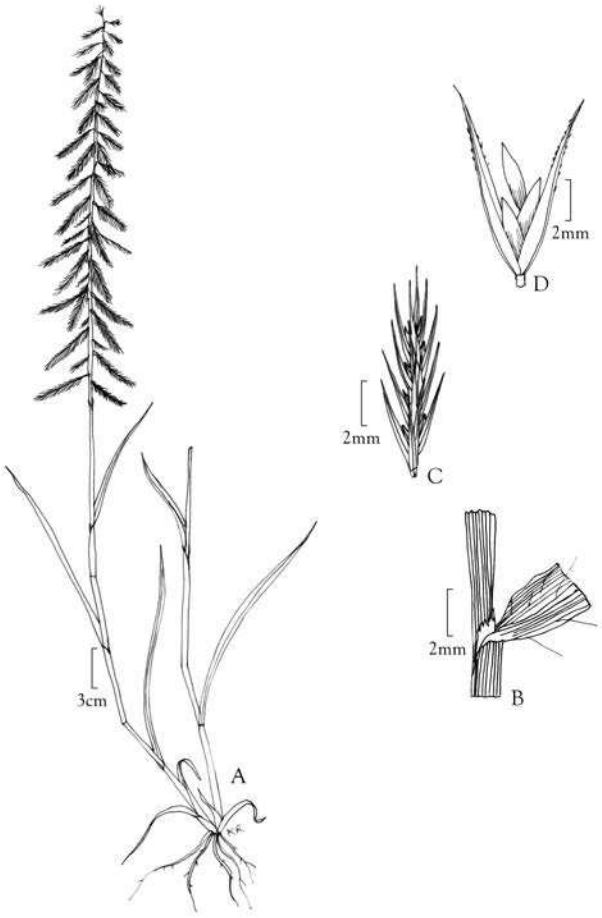


FIGURE 112. *Dinebra retroflexa.* A. Habit. B. Ligule, sheath, and blade. C. Portion of raceme. D. Spikelet. A drawn from *El Hadidi s.n.* (CAI); B–D drawn from *A. Pappi s.n.* (US-1984285).

Leaves basal and cauline; sheaths open, glandular, margins smooth; oral hairs present; ligules 1–1.5 mm long, membranous, apex lacerate; blades 3–30 cm long, 2–6 mm wide, linear, flat, ascending, sparsely hairy, margins smooth, apex acuminate. Racemes 0.6–5 cm long, numerous, borne along a central axis, deflexed, or spreading, linear, oblong or cuneate, unilateral. Spikelets 5.7–9 mm long, cuneate, laterally compressed; lemmas 1.8–2.4 mm long, awnless. Habitat: damp soils and a weed of cultivation. Distribution: (Mm, Ms, Nv, Ol, Ge) tropical Africa, Arabia to India.

104. *Diplachne fusca* (L.) P. Beauv. ex Roem. & Schult.

FIGURE 113

Diplachne fusca (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 615. 1817. [*Leptochloa fusca* (L.) Kunth; *Festuca fusca* L.]
Common names: *heesh, qasaba, sayfoun*; bearded sprangletop, feather grass.

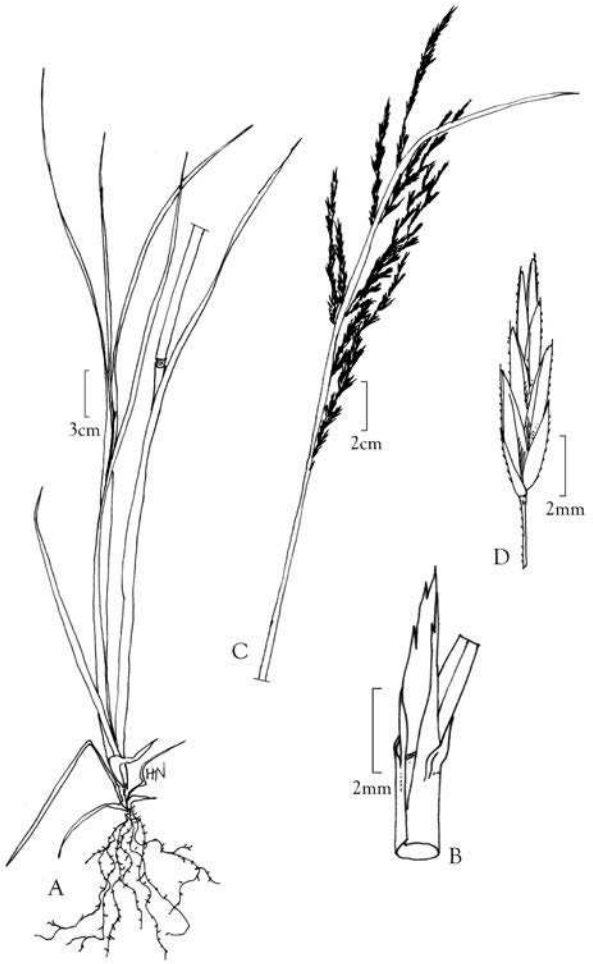


FIGURE 113. *Diplachne fusca.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B–D drawn from *L. Smook 6228* (US-3205640).

Caespitose, aquatic or semiaquatic perennials. Culms up to 150 cm tall, decumbent; internodes glabrous; lower nodes rooting and branching; butt sheaths glabrous. Leaves basal and cauline; sheaths open, ribbed, glabrous, margins smooth; auricles clawlike; ligules 3–6 mm long, membranous, apex acute; blades 20–50 cm long, 2–5 mm wide, linear, convolute, spreading, stiff, midrib widened, scabrous, margins scabrous, apex attenuate. Inflorescences 20–35 cm long, rachis semiterete; racemes 15–35 cm long, 10–30 borne along a central axis, erect, straight. Spikelets 8–15 mm long, elliptic, laterally compressed, packed broadside to rachis; lemmas 2.2–4 mm long, mucronate or with a short awn up to1.5 mm long. Habitat: moist habitats and rice fields. Distribution: (Mm, Ms, Nv, Nn, Di, Ol, Ra, Ge) tropical and subtropical Old World.

105. *Echinochloa colona* (L.) Link

FIGURE 114

Echinochloa colona (L.) Link, Hort. Berol. 2: 209. 1833.
Common names: *abu rokba, hasheesh anaareb, medaad, zafra*; corn panic grass, jungle rice, millet rice.

Caespitose annuals. Culms 15–100 cm tall, decumbent; internodes glabrous; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths flattened, glabrous, margins smooth; ligules absent; blades 3–30 cm long, 2–6 mm wide, linear, flat, ascending, glaucous, scabrous, margins smooth, base broadly rounded, apex acuminate. Racemes 0.5–3 cm long, borne along a central axis, ascending (rarely) or appressed, simple. Spikelets 1.5–3 mm long, in pairs, ovate or orbicular, dorsally compressed, gibbous, apex acute or cuspidate; lemmas awnless. Habitat: aquatic and moist areas. Distribution: (Mm, Ms, Nv, Nn, Dl, Dg, Di, Ol, On, S, Ra, Ge) tropics and subtropics.

106. *Echinochloa crus-galli** (L.) P. Beauv.

FIGURE 115

*Echinochloa crus-galli** (L.) P. Beauv., Ess. Agrostogr. 53, 161. 1812.
Common names: *denaab, dineiba sultani*; large barnyard grass.

Caespitose annuals. Culms 15–100 cm tall, decumbent; internodes glabrous; butt sheaths scarious, glabrous. Leaves basal and cauline, sparsely hairy, margins smooth; collars dark colored; ligules absent; blades 5–30 cm long, 5–10 mm wide, linear, flat, spreading, flaccid, scabrous, margins smooth, apex acuminate. Racemes 2–10 cm long, 5–15 borne along a central axis, ascending. Spikelets 3–4 mm long, in pairs, elliptic, dorsally compressed, gibbous, apex acuminate; principal lemma awns 0–50 mm long, erect, bristly.

Habitat: aquatic and moist habitats, rice fields, probably introduced.

Distribution: (Mm, Ms, Nv, Ol) tropical Africa to India.

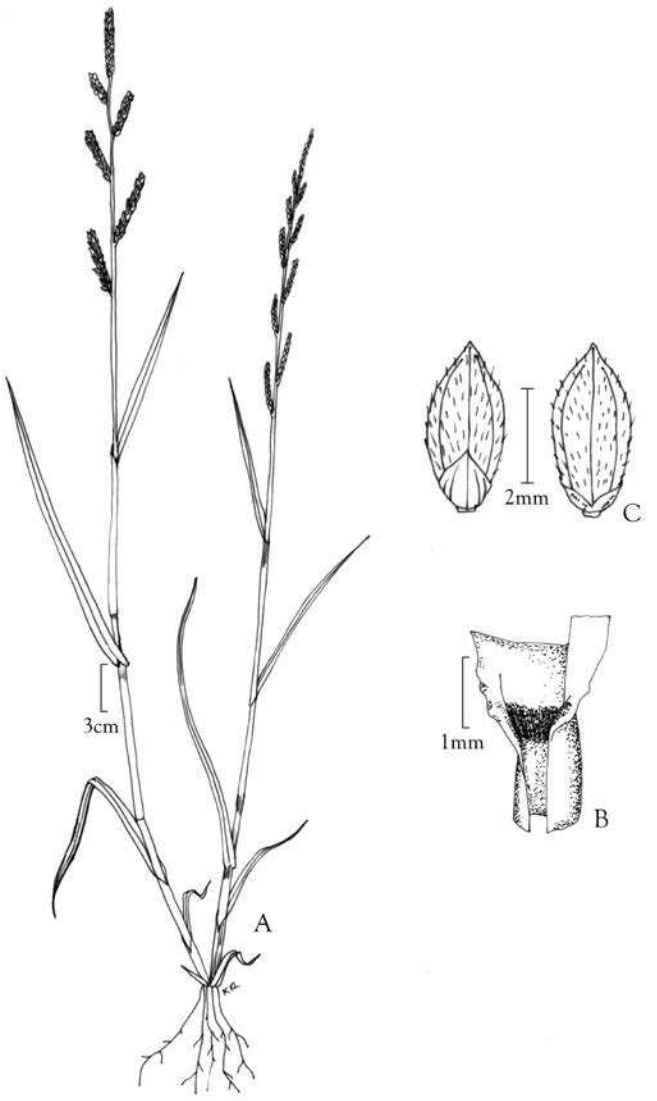


FIGURE 114. *Echinochloa colona.* A. Habit. B. Ligule, sheath, and blade C. Spikelets with upper (right) and lower (left) glumes. A drawn from *N. El-Hadidi s.n.* (CAI); B drawn from *W. Burger 2167* (US-2465212); C modified from Michael (2003).

107. *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase

FIGURE 116

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

Solitary reedlike perennials; rhizomes elongated. Culms up to 400 cm tall, bamboo-like, erect, robust firm; internodes

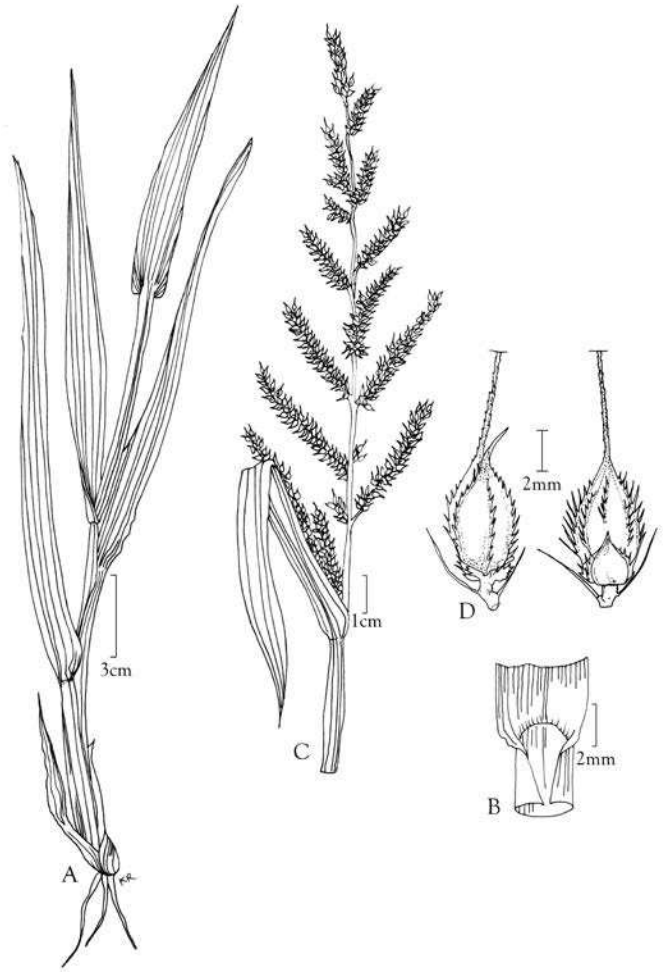


FIGURE 115. *Echinochloa crus-galli.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with lower (left) and upper (right) glumes. A–C drawn from *R. Kanal 2406* (US-3268322); D modified from Michael (2003).

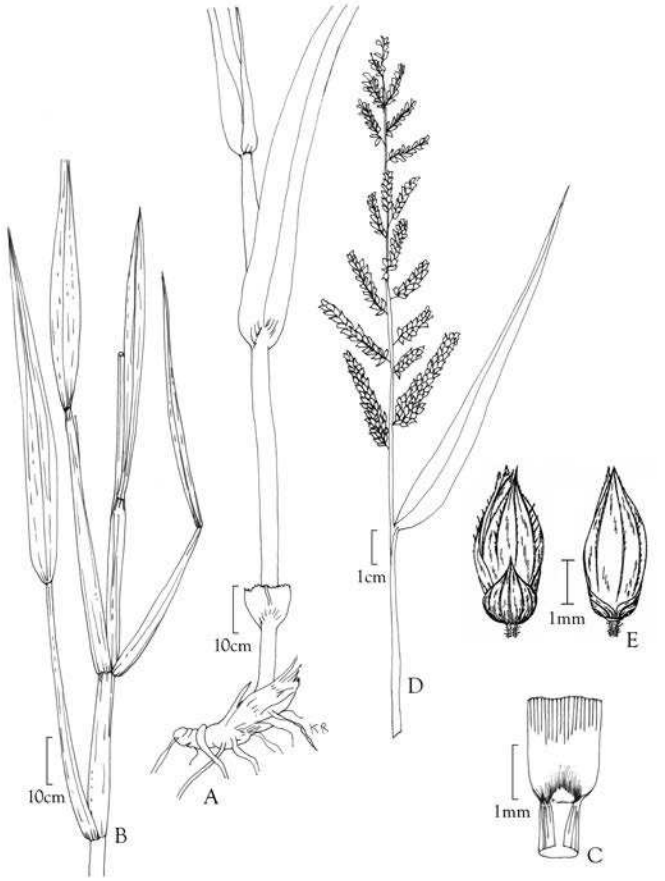


FIGURE 116. *Echinochloa pyramidalis*. A. Lower culm. B. Leaves. C. Ligule, sheath, and blade. D. Inflorescence. E. Spikelet. A, B, D modified from Ibrahim and Kabuye (1988); C drawn from *K. Addei, 592* (US-2209083); E modified from Michael (2003).

glabrous, striate; nodes glabrous, lower nodes rooting; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths glabrous, glaucous, ribbed, margins membranous; auricles clawlike; oral hairs present; ligules 1 mm long, a fringe of hairs; blades 5–50 cm long, 2–20 mm wide, linear, flat, spreading, scabrous, margins cartilaginous, base broadly rounded, apex attenuate. Racemes 3–20 cm long, borne along a central axis, the racemes overlapping, ascending. Spikelets 2.5–3.5(–4) mm long, in pairs, elliptic or ovate, dorsally compressed, apex acute; lemmas usually unawned, sometimes mucronate or with awns 2–3 mm long. Habitat: swamps and along rivers, usually in water. Distribution: (Nn? or Nv?) tropical, S Africa and Arabia.

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

FIGURE 117

Echinochloa stagnina (Retz.) P. Beauv., Ess. Agrostogr. 53, 161, 171. 1812.

Common names: *amosheet, moddeid*.

Solitary perennials, sometimes behaving as annuals; rhizomes elongated. Culms up to 200 cm tall, spongy, decumbent; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; auricles clawlike; oral hairs present; ligules a fringe of hairs; blades 10–40 cm long, 2–10 mm wide, linear, flat, spreading, flaccid, glaucous, scabrous, margins smooth, base broadly rounded, apex acuminate. Racemes 2–8 cm

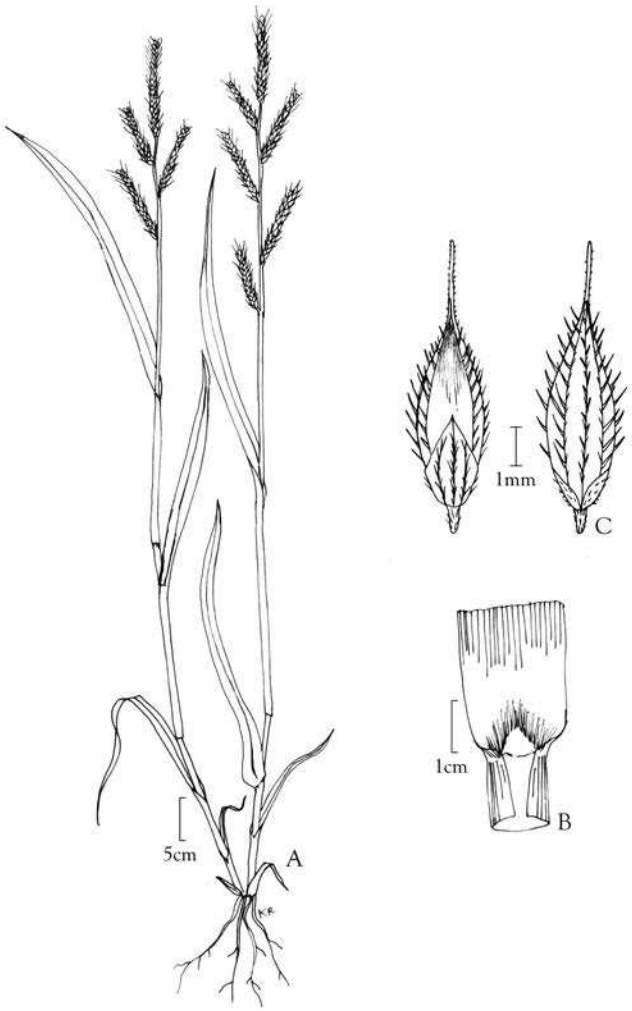


FIGURE 117. *Echinochloa stagnina.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with upper (left) and lower (right) glumes. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *A. Pappi* (US-1984300).

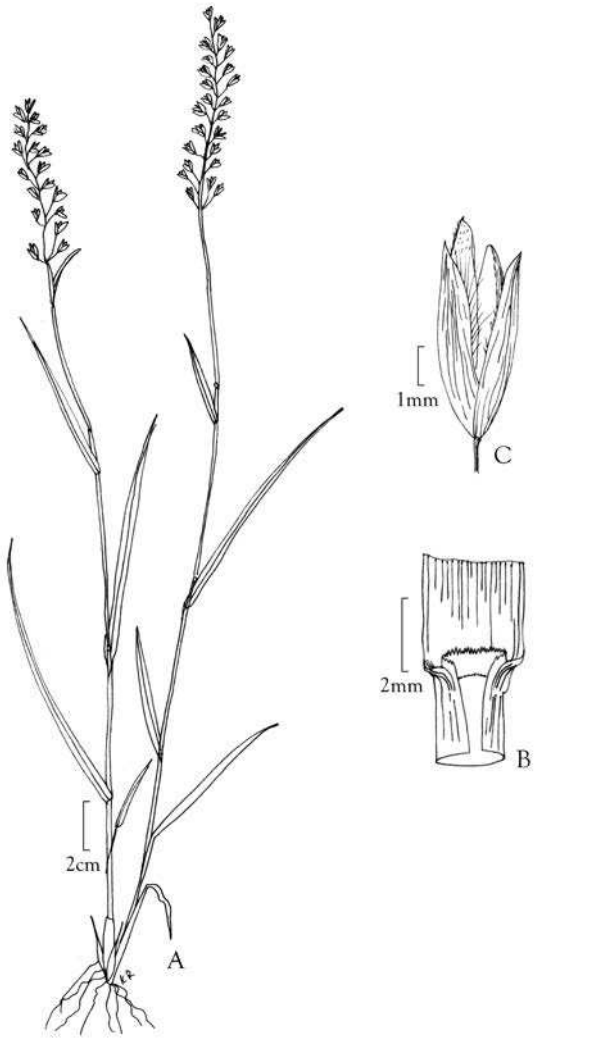


FIGURE 118. *Ehrharta calycina.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *J. R. Swallen 10534* (US-2432070), *G. Davidse 33563* (US-3596089).

long, borne along a central axis, the racemes overlapping, flexuous. Spikelets 3.5–6 mm long, in pairs, elliptic, dorsally compressed, apex acuminate; principal lemma awns 3–20(–50) mm long. Habitat: weed of cultivation and canal banks. Distribution: (Mm, Ms, Nv, Ol) tropical Africa to India.

109. *Ehrharta calycina** Sm.

FIGURE 118

*Ehrharta calycina** Sm., Pl. Icon. Ined. t. 33. 1790.
Common name: annual veldtgrass.

Caespitose perennials or rarely annuals; rhizomes elongated or absent. Culms 15–60 cm tall, erect, geniculate; internodes glabrous, striate; nodes dark; butt sheath scarious. Leaves basal and cauline; sheaths glabrous, margins membranous; ligules 1–3 mm long, a ciliate membrane; blades 3–20 cm long, 1–3 mm wide, filiform, revolute, ascending, pubescent, margins ciliate, wavy, apex acuminate. Panicles 5–25 cm long, open or contracted, linear or oblong, equilateral, nodding. Spikelets 4–8 mm long, cuneate, laterally compressed; lower lemma awnless. Habitat: grasslands and disturbed sites, introduced. Distribution: (Mm) S Africa.

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

FIGURE 119

Eleusine africana Kenn.-O'Byrne, Kew Bull. 12: 65. 1957.

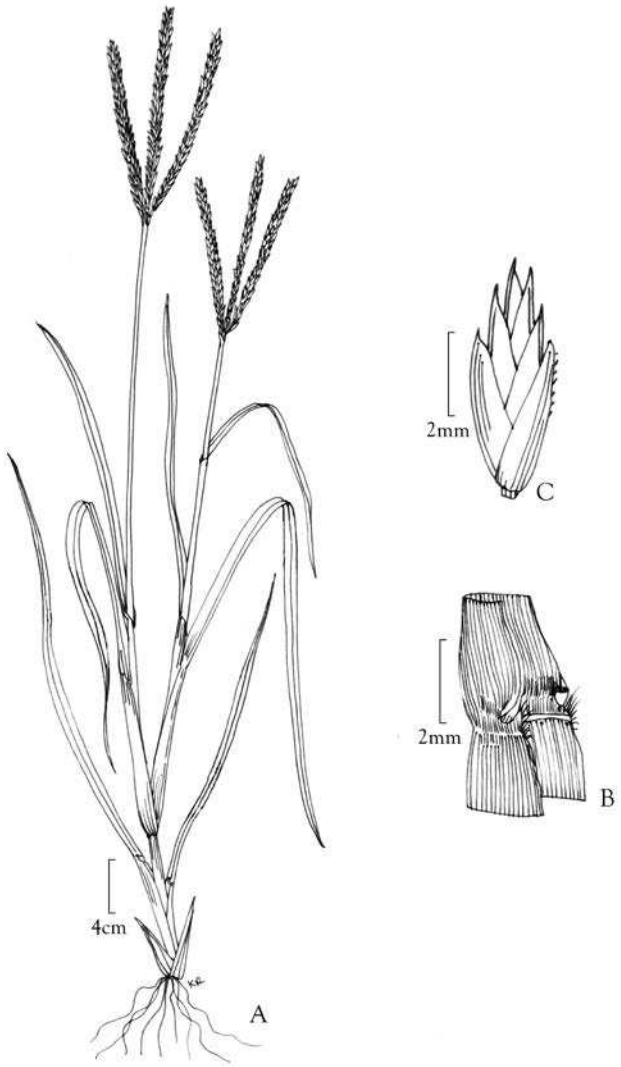


FIGURE 119. *Eleusine africana.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 6513* (CAI); B, C drawn from *O. Olufsen 509* (US-1448089).

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

111. *Eleusine coracana* (L.) Gaertn.

FIGURE 120

Eleusine coracana (L.) Gaertn., Fruct. Sem. Pl. 1: 8, pl. 1, f. 11. 1788.

Common names: African millet, finger millet.

Caespitose annuals. Culms up to 200 cm tall, erect, straight, robust; internodes glabrous, elliptical in cross section; nodes dark; butt sheaths scarious, glabrous. Leaves basal and cauline; sheaths keeled, open, glabrous, ribbed, margins sparsely hairy; oral hairs ciliate; ligules 1–2 mm long, a ciliolate membrane; blades 20–60 cm long, 5–10 mm wide, linear, flat or conduplicate, ascending, surfaces scabrous, hairy on basal ⅓, margins ciliate, bases narrow, apex acuminate. Inflorescence with

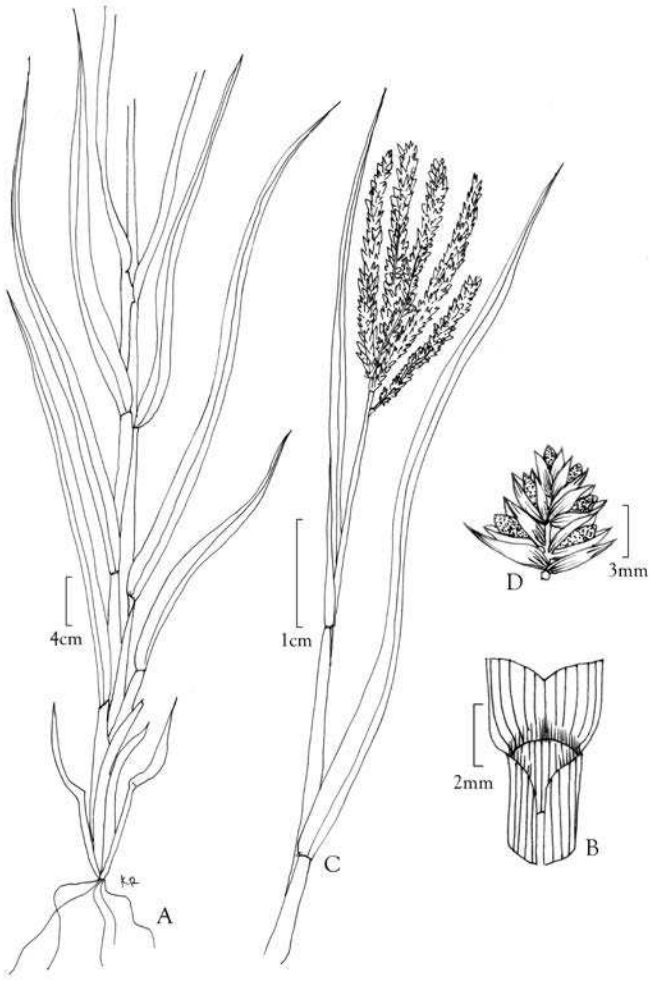


FIGURE 120. *Eleusine coracana.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *A. V. Bogdan, AB6628* (US-2599325).

4–7 digitately borne racemes; racemes 3–8 cm long, 9–15 mm wide, unilateral. Spikelets 5–10 mm long, 3–9-flowered, ovate, laterally compressed; lemmas 2.2–4.7 mm long, awnless. Caryopsis globose. Habitat: cultivated. Distribution: (Mm, Nv) Old World tropics and subtropics.

112. *Eleusine floccifolia* (Forssk.) Spreng.

FIGURE 121

Eleusine floccifolia (Forssk.) Spreng., Syst. Veg. 1: 350. 1824.

Densely caespitose perennials; rhizomes short. Culms 20–70 cm tall, erect, straight, subterete in cross section, robust; internodes elliptical in cross section, glabrous; nodes dark; butt sheaths scarious, glabrous. Leaves mostly basal; sheaths keeled, open, glabrous, margins membranous; oral hairs present; ligules 0.5–1 mm long, membranous, apex truncate; blades 5–40 cm long, 2–5 mm wide, linear, flat or conduplicate, ascending, scabrous with tufts of short white hairs along margins, apex acute. Inflorescence with 2–10 digitately borne racemes; racemes 2.5–12 cm long, spreading or ascending, unilateral. Spikelets 3.3–6.8 mm long, 4–7-flowered, elliptic, laterally compressed; lemmas 2.8–4.6 mm long, awnless. Caryopsis elliptic-oblong. Habitat: introduced. Distribution: (Nv) Ethiopia, Somalia, and Arabia.

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

FIGURE 122

Eleusine indica (L.) Gaertn., Fruct. Sem. Pl. 1: 8. 1788.
Common names: *negeil*; fowlfoot grass, Indian goose grass, wire grass, yard grass.

Caespitose annuals. Culms 10–70 cm tall, erect, geniculate, subterete; internodes elliptical in cross section, minutely ciliolate; nodes dark; butt sheaths scarious, glabrous. Leaves mostly basal; sheaths keeled, open, sparsely hairy, margins sparsely hairy; oral hairs present; ligules 0.5–1 mm long, membranous, apex truncate; blades 5–30 cm long, 2–5 mm wide, linear, flat or conduplicate, ascending, sparsely hairy, margins smooth, bases narrow, apex acute. Inflorescence with 1–10(–17) digitately borne racemes;

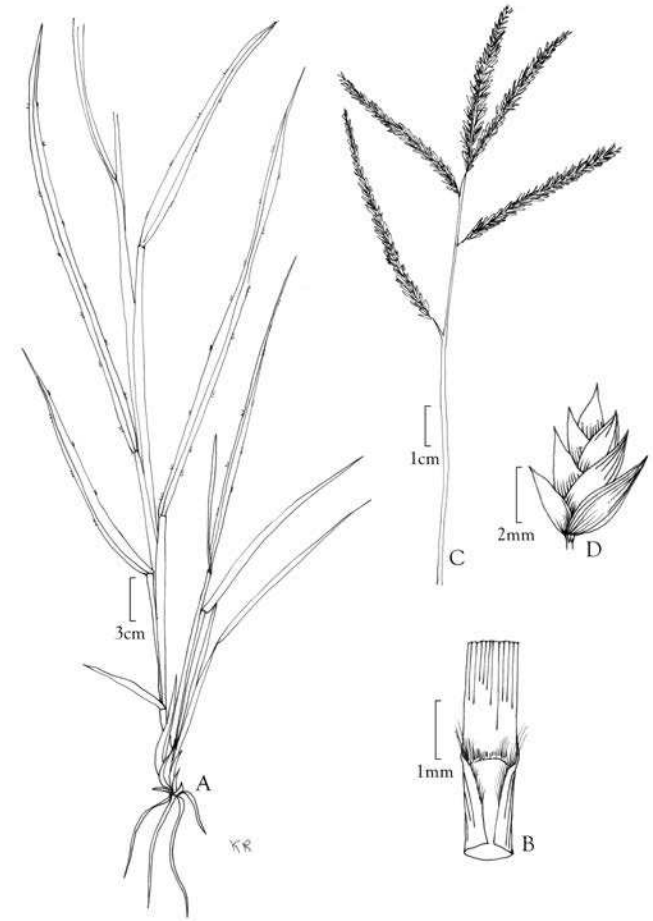


FIGURE 121. *Eleusine floccifolia.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *A. Pappi s.n.* (CAI).

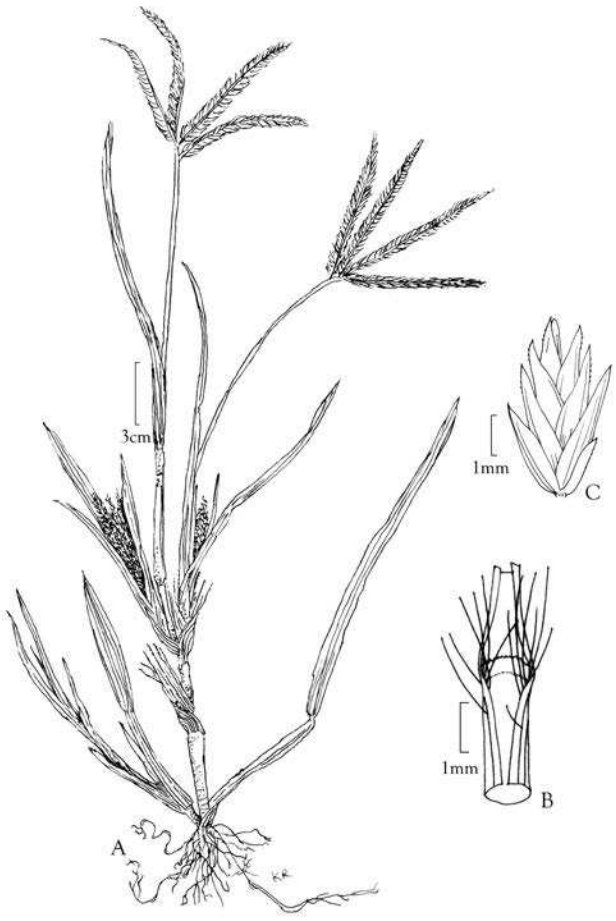


FIGURE 122. *Eleusine indica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *E. C. Leonard 19514* (US-1866464), *R. Kanal 177* (US-3117706); C modified from Hilu (2003).

racemes 3.5–15.5 cm long; 3–3.5 mm wide, unilateral. Spikelets 4.6–7.8 mm long, 3–9-flowered, elliptic, laterally compressed; lemmas 2.1–3.6 mm long, awnless. Caryopsis elliptic. Habitat: weed of cultivation and waste places. Distribution: (Mm, Ms, Nv, Di, Ol, On, S) pantropical.

114. *Elionurus royleanus* Nees ex A. Rich.

FIGURE 123

Elionurus royleanus Nees ex A. Rich., Tent. Fl. Abyss. 2: 471. 1850.

Caespitose annuals. Culms 5–20 cm tall, erect, weak, semiterete in cross section, fastigiate branching; internodes glabrous; nodes bearded; butt sheaths withering, pubescent to hirsute. Leaves mostly cauline; sheaths much longer than blade, keeled, open, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 0.1–18 cm long, 1–2 mm wide, linear, flat or conduplicate, ascending, scabrous, hairy on basal ⅓, margins smooth, apex acuminate. Inflorescence a solitary raceme; racemes 2–6 cm long, subtended by inflated leaf sheaths, embraced at base by subtending leaf; rachis fragile at the nodes, subterete, villous. Sessile spikelets 11–14 mm long, in pairs, lanceolate, dorsally compressed; lemmas awnless. Habitat: stony and sandy soils, rocky slopes. Distribution: (Ra, Ge) tropical Africa to NW India.

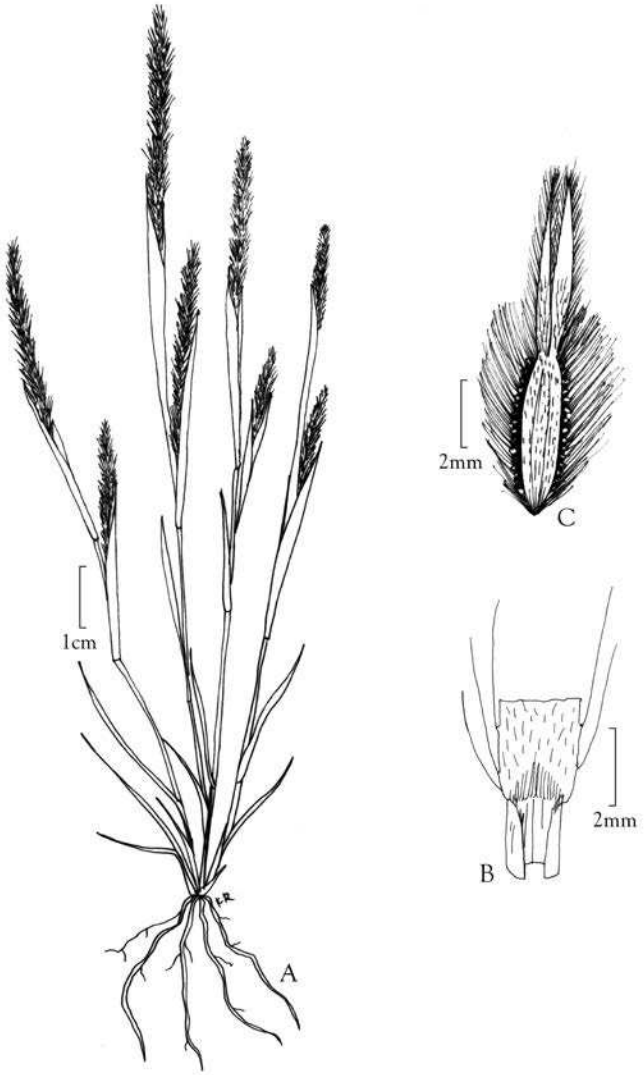


FIGURE 123. *Elionurus royleanus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Zahran 1326*; B drawn from *Bogdan AB4339* (US-2473058); C modified from Ibrahim and Kabuye (1988).

115. *Elymus elongatus* (Host) Runemark subsp. *elongatus*

FIGURE 124

Elymus elongatus (Host) Runemark, Hereditas (Lund) 70(2): 156. 1972.

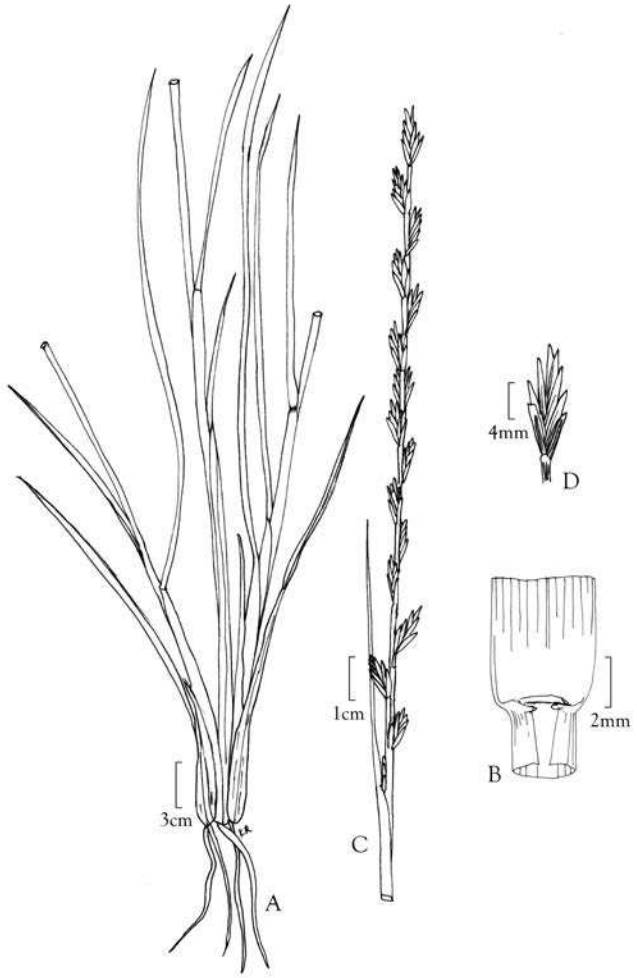


FIGURE 124. *Elymus elongatus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *N. Shorbagy s.n.*(CAI); B–D drawn from *K. H. Rechinger 14011* (US-1936763).

Caespitose perennials. Culms 35–70 cm tall, erect, robust; internodes glabrous, striate; butt sheaths withering, pubescent to hirsute. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth, glabrous; auricles clawlike; ligules 1–2 mm long, membranous, apex smooth; blades 20–45 cm long, 2–5 mm wide, linear, convolute, flaccid, spreading, ribbed, sparsely hairy or pubescent, margins ciliate, bases narrow, apex acuminate. Inflorescence a single, bilateral spike; spikes 10–25 cm long; rachis flattened, glabrous. Spikelets 12–25 mm long, elliptic to oblong, strongly laterally compressed; lemmas 9–11 mm long, awnless. Habitat: damp sandy soils. Distribution: (Mm, Ms) Mediterranean and SW Asia.

116. *Elymus farctus* (Viv.) Runemark ex Melderis

FIGURE 125

Elymus farctus (Viv.) Runemark ex Melderis, Bot. J. Linn. Soc. 76(4): 382. 1978.

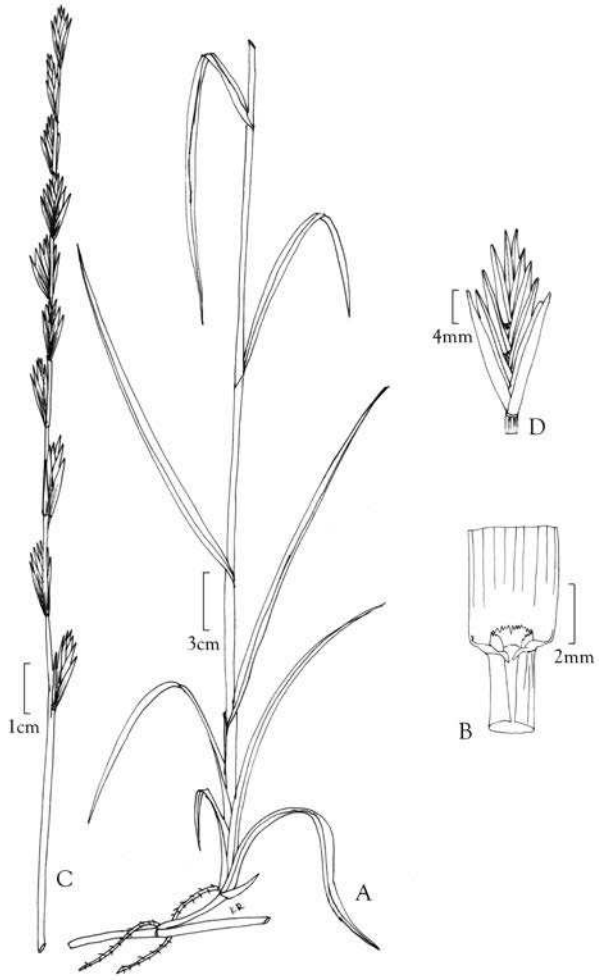


FIGURE 125. *Elymus farctus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *G. Maire s.n.* (CAI); B–D drawn from *K. H. Rechinger 4555* (US-1760877).

Caespitose perennials; rhizomes elongated. Culms 15–55 cm tall, erect, straight, glabrous, ridged; butt sheaths scarious, glabrous. Leaves mostly cauline; sheaths glabrous, ribbed margins smooth; collars dark colored; ligules 0.5–1 mm long, membranous, apex erose, truncate; blades 10–25 cm long, 2–5 mm wide linear, involute, straight, firm, ribbed, pubescent, margins smooth, bases narrow, apex acuminate. Inflorescence a single, bilateral spike; spikes 4–20 cm long, erect; rachis fragile at the nodes. Spikelets 15–28 mm long, oblong or cuneate, laterally compressed; lemmas 10–18 mm long, awnless. Habitat: coastal sand. Distribution: (Mm, Ms) Europe, Mediterranean, and SW Asia.

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

FIGURE 126

*Elymus repens** (L.) Gould, Madroño 9(4): 127. 1947.

Common names: couch grass, creeping wildrye, quack grass, witch grass.



FIGURE 126. *Elymus repens.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. Kanal 029* (US-3073415) and *C. Chase s.n.* (US-906859); C modified from Barkworth et al. (2007).

Caespitose perennials; rhizomes elongated. Culms 20–100 cm tall, erect, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths scarious, glabrous. Leaves mostly cauline, glaucous; sheaths glabrous, ribbed, margins smooth; auricles clawlike; collars broad; ligules 0.3–1 mm long, membranous; apex truncate; blades 5–20 cm long, 3–6 mm wide, linear, flat ascending, glabrous or scaberulous, margins scabrous, apex acuminate, hardened. Inflorescence a single, bilateral spike; spikes 5–20 cm long, erect; rachis flattened, pubescent. Spikelets 10–20 mm long, 3–6 mm wide, elliptic to oblong, laterally compressed; lemmas 6–13 mm long, usually awnless. Habitat: roadsides and cultivated. Distribution: (Nn? or Nv?) Europe, Mediterranean, and temperate Asia.

118. *Enneapogon desvauxii* P. Beauv.

FIGURE 127

Enneapogon desvauxii P. Beauv., Ess. Agrostogr. 82, 161, t. 16, f. 11. 1812.

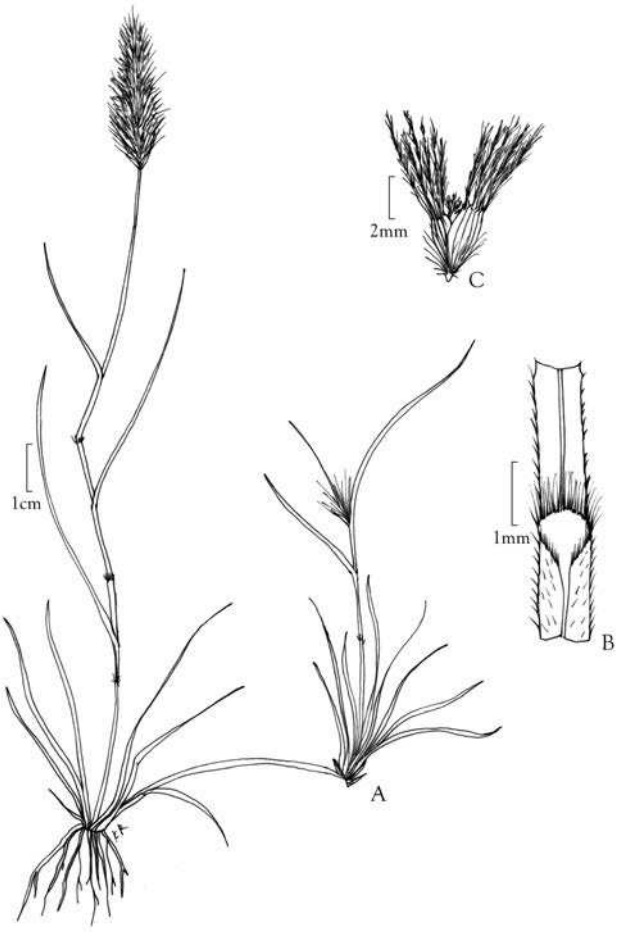


FIGURE 127. *Enneapogon desvauxii*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran s.n.* (CAI); B drawn from *H. S. Gentry 14443* (US-3564518); C modified from Ibrahim and Kabuye (1988).

Caespitose perennials or sometimes annuals. Culms 5–20 cm tall, erect, geniculate, wiry; internodes hirsute; nodes bearded; butt sheaths persistent, sparsely hairy, forming a pseudobulbous base. Leaves basal and cauline; sheaths flattened, open, sparingly hairy, margins hairy; oral hairs present; ligule a fringe of hairs; blades 3–10 cm long, 1–2 mm wide, filiform, convolute, ascending, stiff, surfaces sparsely hairy or pilose, margins scabrous, bases narrow, apex attenuate. Panicles 2–8 cm long, spiciform, oblong or ovate. Spikelets 2.8–5.5 mm long, 3-flowered, oblong, laterally compressed; lemmas 3.4–6 mm long, densely villous, 9-awned, awns 2.5–5 mm long, straight, ciliate below. Habitat: rocky slopes and sandy soils. Distribution: (S, Ra, Ge) Africa, India, China, and America.

119. *Enneapogon lophotrichus* Chiov. ex H. Scholz & P. König

FIGURE 128

Enneapogon lophotrichus Chiov. ex H. Scholz & P. König, Willdenowia 13(2): 369. 1983.

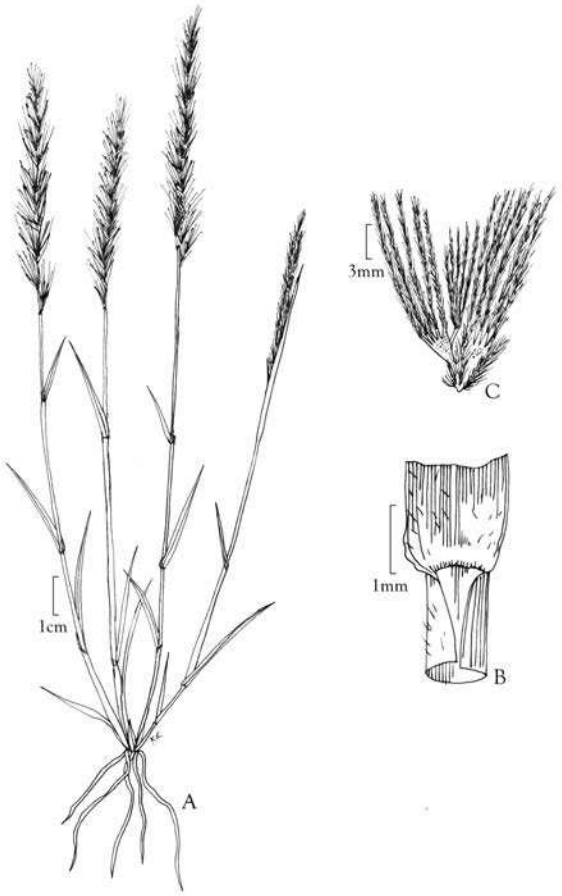


FIGURE 128. *Enneapogon lophotrichus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran 813* (CAI); B, C drawn from *W. Burger 3536* (US-2473267) and *3529* (US-2473273).

Caespitose annuals. Culms 10–20 cm tall, erect, geniculate; internodes glabrous; butt sheaths persistent, pubescent. Leaves basal and cauline; sheaths longer than blades, flattened, open, hairy, ribbed, margins hairy; ligules a fringe of hairs; blades 3–10 cm long, 0.5–3 mm wide, narrow linear or filiform, convolute, ascending, stiff, pilose, margins scabrous, bases narrow, apex acuminate. Panicles 1–4 cm long, loosely contracted. Spikelets 5–7.5 mm long, 6-flowered, oblong, laterally compressed; lemmas 1.5–5 mm long, lowest with 3 basal tufts of hairs, 9-awned; awns 3–4 mm long, straight, bristly, ciliate below. Habitat: stony soils among rocks and wadi beds. Distribution: (Ge) Ethiopia, Somalia, and Arabia.

120. *Enneapogon persicus* Boiss.

FIGURE 129

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

Caespitose perennials. Culms 10–60 cm tall, erect, geniculate; internodes glabrous; butt sheaths persistent, pubescent. Leaves basal and cauline; sheaths longer than blades, flattened, glabrous, ribbed, margins membranous; ligules a fringe of hairs; blades 3–15 cm long, 2–3 mm wide, filiform, convolute, ascending, stiff, pilose with capitate hairs, margins scabrous, bases narrow; apex acuminate, spiny, pungent. Panicles 3–10 cm long, 1.5–2 cm wide, loosely contracted to spiciform, linear or lanceolate. Spikelets 5.5–11.5 mm long, 4-flowered, oblong, laterally compressed; lemmas 1.2–5 mm long, 9-awned, awns 4–7 mm long, straight, bristly, ciliate below. Habitat: stony slopes and rocky sites, grasslands. Distribution: (Nv, Nn, Ge) tropical Africa, S and SW Asia to India.

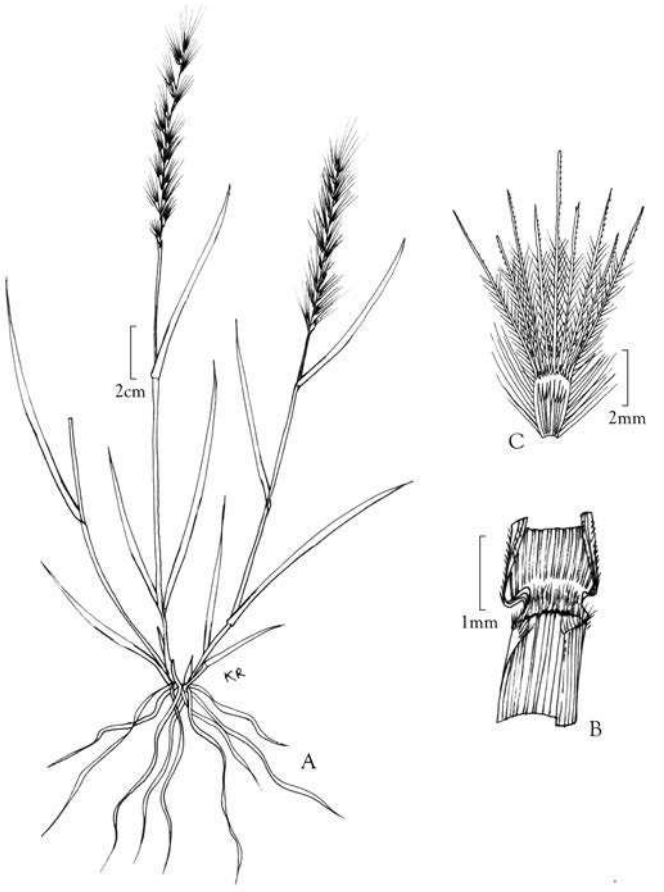


FIGURE 129. *Enneapogon persicus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran 248* (CAI); B, C drawn from *M. Nath* (US-2044576), *H. S. Gentry 12737* (US-2153633).

121. *Enneapogon scaber* Lehm.

FIGURE 130

Enneapogon scaber Lehm., Nov. Stirp. Pug. 3: 41. 1831.

Caespitose perennials. Culms 10–50 cm tall, erect, geniculate semiterete; internodes glabrous; butt sheaths withering, glabrous. Leaves basal and cauline; sheaths pubescent, ribbed, margins

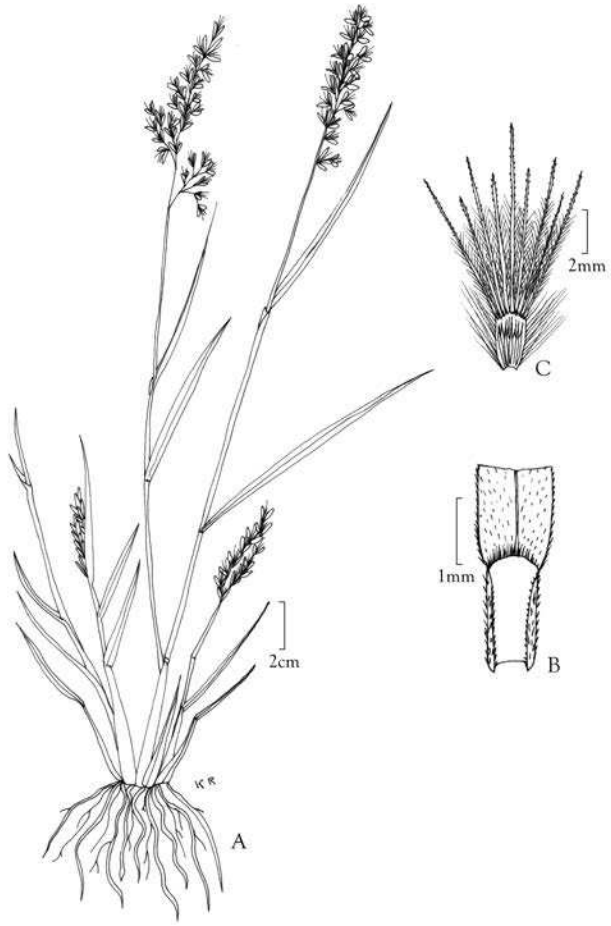


FIGURE 130. *Enneapogon scaber*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran 1022*; B, C drawn from *H. G. Schweikerdt 2274* (US-2462031).

smooth; ligules a fringe of hairs; blades 3–20 cm long, 1–3 mm wide, linear, convolute, ascending, stiff, pubescent, margins scabrous, bases narrow, apex acuminate. Panicles 2–7 cm long, oblong, loosely contracted. Spikelets 4.5–6.5 mm long, 3-flowered, oblong, laterally compressed; lemmas 1.5–6.5 mm long, 9-awned, awns 1–1.3 mm long, straight, bristly, scabrous. Habitat: stony slopes. Distribution: (Ge) N Africa and Somalia, S Africa.

122. *Eragrostis aegyptiaca* (Willd.) Delile

FIGURE 131

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

Caespitose annuals. Culms 1–46(–60) cm tall, erect to decumbent and prostrate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blade, open, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 8–25 cm long, 1–3 mm wide, linear, flat or involute, ascending or spreading, glabrous, margins scabrous, apex acuminate. Panicles 3–20 cm long, linear or lanceolate, open to somewhat contracted, embraced at base by subtending leaves; primary branches appressed or ascending, whorled at the lower nodes. Spikelets 3.5–15 mm long, 9–20-flowered, linear or oblong, laterally compressed; lemmas 1.5–1.8 mm long, awnless. Habitat: sandy soils. Distribution: (Mm, Nv, Nn, Di, Ge) Senegal, N Nigeria, Mali, Chad, and Sudan (Cope, 2005).

KEY TO THE SUBSPECIES

1a. Culms to 45(–60) cm tall, erect or ascending . . . . . *E. aegyptiaca* **subsp.** ***aegyptiaca***
1b. Culms 1–5 cm tall, prostrate . . . . . *E. aegyptiaca* **subsp.** ***humifusa*** **H. Scholz, Willdenowia 26: 231. 1996**



FIGURE 131. *Eragrostis aegyptiaca.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *A. Amer 12617* (CAI); B, C drawn from *S. Lægaard 21316* (US-3432588).

123. *Eragrostis aspera* (Jacq.) Nees

FIGURE 132

Eragrostis aspera (Jacq.) Nees, Fl. Afr. Austral. Ill. 408. 1841.
Common name: *eilaab gabal*.

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

124. *Eragrostis barrelieri* Daveau

FIGURE 133

Eragrostis barrelieri Daveau, J. Bot. (Morot) 8: 289. 1894.
Common name: Mediterranean lovegrass.

Caespitose annuals. Culms 5–40 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, margins membranous; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 2–10 cm long, 1–3 mm wide, linear, conduplicate, appressed, glabrous, glaucous, margins scabrous, bases narrow, apex acuminate. Panicles 3–20 cm long, open, lanceolate or oblong; branches stiff, with glandular regions below the nodes forming bands. Spikelets 5–20 mm long, 1.3–2 mm wide, 8–25-flowered; oblong, laterally compressed; lemmas 1.7–2.3 mm long, awnless. Habitat: weed of cultivation. Distribution: (Mm, Nv,

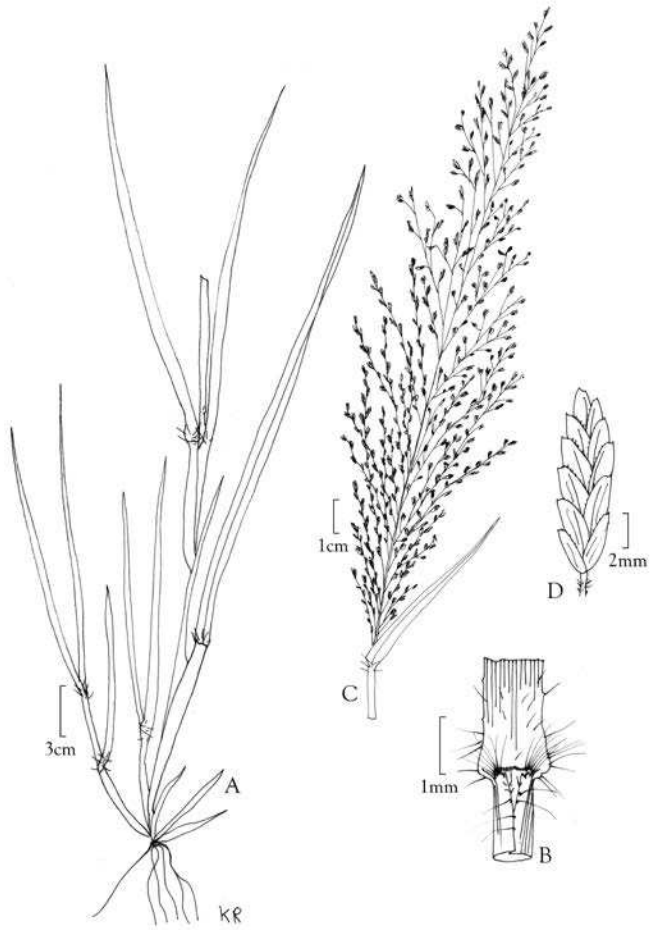


FIGURE 132. *Eragrostis aspera.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from *A. J. Salubeni 449* (US-2604689).

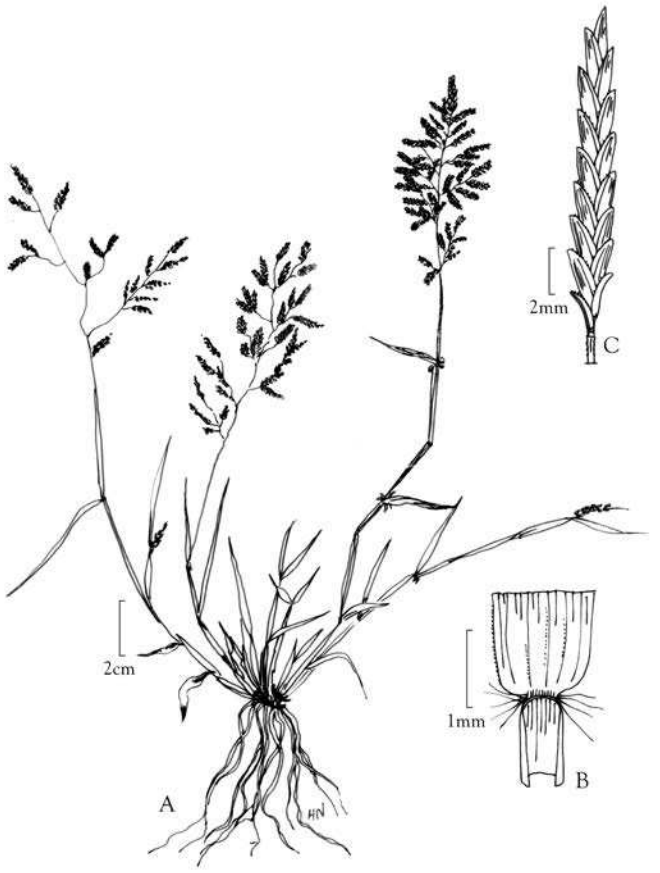


FIGURE 133. *Eragrostis barrelieri.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, W. Girgis, M. Zahran s.n.*; (CAI); B and C, drawn from *S. Laegaard 15835* (US-3292376) and *15856* (US-3292353).

Nn, Dl, Di, Ol, On, S, Ge) Mediterranean region, tropical Africa to SW Asia.

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

FIGURE 134

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

Caespitose annuals. Culms 10–70(–100) cm tall, erect, geniculate; internodes glabrous, glossy; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, ribbed, margins smooth; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 3–15 cm long, 2–6 mm wide, involute, spreading, glabrous, margins glandular or eglandular, apex acuminate. Panicles 4–30 cm long, open or contracted, ovate, dense or loose. Spikelets 3–20 mm long, 2–4 mm wide, 8–30-flowered, oblong or ovate, laterally compressed; lemmas 2–2.5 mm long, keel with 1–3 crateriform glands, awnless. Habitat: sandy and gravelly areas, along riverbanks, and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Dl, Di, Ol, Ra, Ge) tropical and warm temperate regions.

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

FIGURE 135

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

Caespitose annuals. Culms 5–50 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves

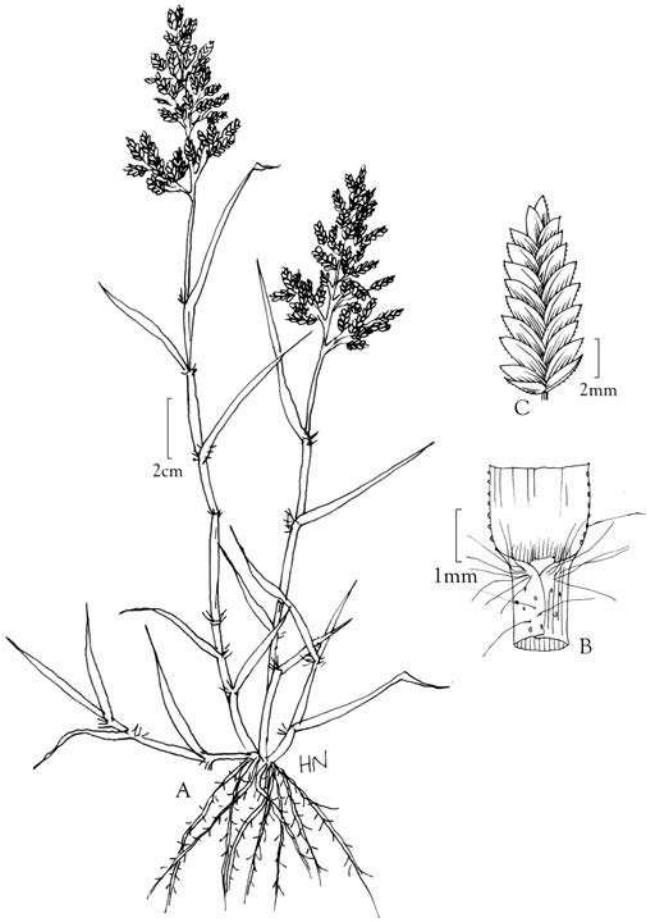


FIGURE 134. *Eragrostis cilianensis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. Kanal 670* (US-320567); C modified from Peterson (2003).

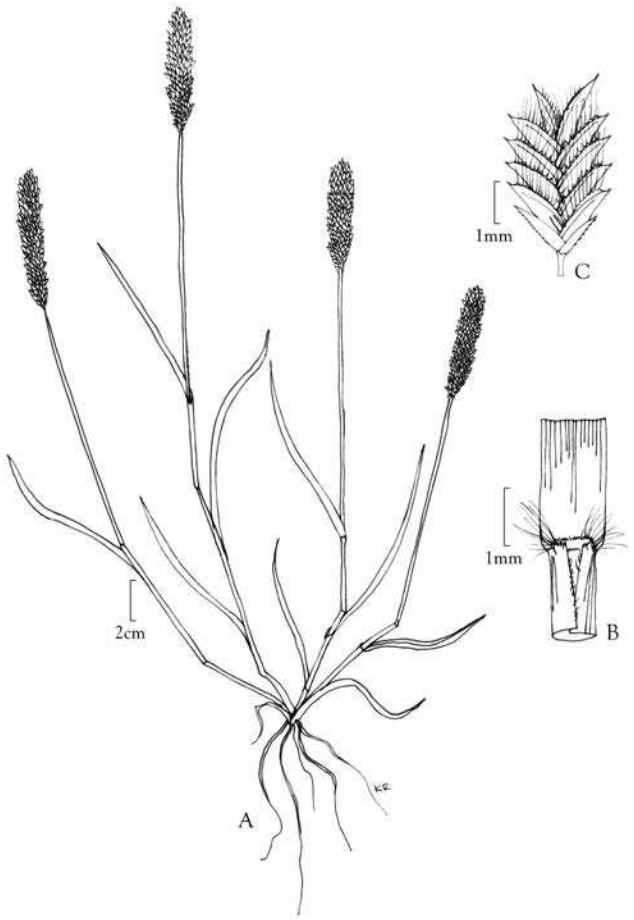


FIGURE 135. *Eragrostis ciliaris*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. Kanal 670* (US-320567); C modified from Peterson (2003).

mainly cauline; sheaths longer than blade, flattened, open, glabrous, ribbed, margins smooth; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 2–12 cm long, 1–3 mm wide, linear, convolute, flaccid, surfaces glabrous, margins scabrous, bases narrow, apex acuminate. Panicles 1–20 cm long, spiciform, linear or oblong, continuous or interrupted; branches stiff, glandular. Spikelets 2–4.5 mm long, 6–12-flowered, ovate, laterally compressed; lemmas 0.8–1.5 mm long, awnless; palea keels pectinate-ciliate. Habitat: sandy soils, sand dunes, and grasslands. Distribution: (Ra, Ge) throughout the tropics.

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

FIGURE 136

Eragrostis japonica (Thunb.) Trin., Mém. Acad. Imp. Sci. Saint-Pétersbourg, sér. 6, Sci. Math. 1(4): 405. 1830.
Common name: pond lovegrass.

Caespitose annuals. Culms 10–80 cm tall, erect, geniculate; internodes glabrous, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy, ribbed, margins smooth; oral hairs present; ligules 0.3–0.6 mm long, a ciliate membrane; blades 3–25 cm long, 1–5 mm wide, linear, flat, flaccid, scabrous, margins cartilaginous, bases narrow, apex acuminate. Panicles 4–50 cm long, open, lanceolate or ovate. Spikelets 1–2 mm long, 4–14-flowered, oblong or ovate, laterally compressed; lemmas 0.7–1 mm long, awnless.

Habitat: sandy soils in alluvial flats and drainages. Distribution: (Nv, Nn) tropical Africa to SE Asia.

128. *Eragrostis lepida* (Hochst. ex A. Rich.) Hochst. ex Steud.

FIGURE 137

Eragrostis lepida (Hochst. ex A. Rich.) Hochst. ex Steud., Flora 38: 327. 1855.

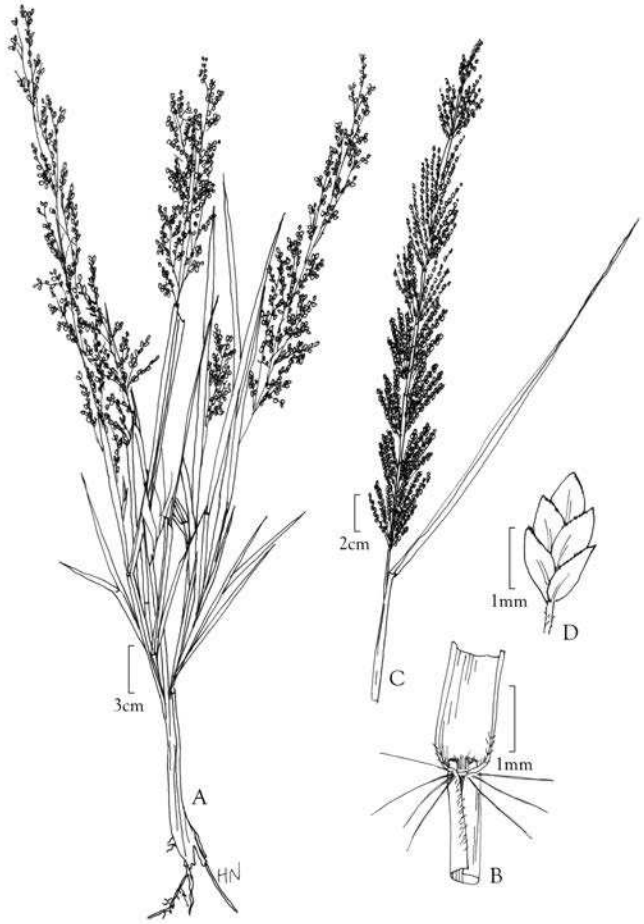


FIGURE 136. *Eragrostis japonica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B–D drawn from *S. Laegaard 21316* (US-3432588).

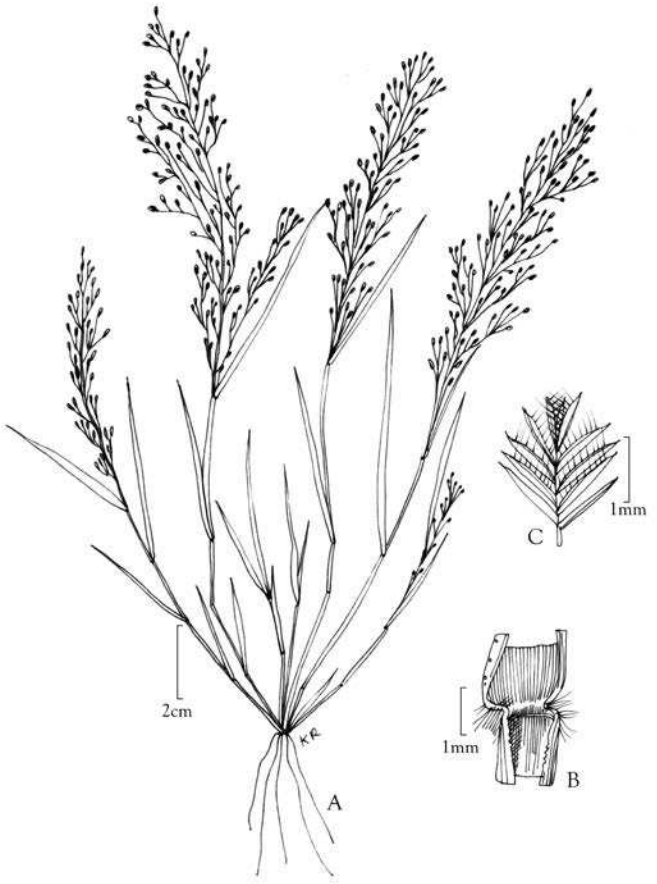


FIGURE 137. *Eragrostis lepida.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from G. *Täckholm s.n.* (CAI); B, C drawn from *S. Laegaard 15857* (US-3292354).

Caespitose, annuals. Culms 10–30 cm tall, erect, geniculate; internodes glabrous, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths open, glabrous, ribbed, margins scabrous; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 2–10 cm long, 1–3 mm wide, linear, flat, straight, spreading, glabrous, margins cartilaginous, apex acuminate. Panicles 3–10(–15) cm long, open, lanceolate or elliptic; branches capillary. Spikelets 2–3 mm long, 5–13-flowered, elliptic or oblong, laterally compressed; lemmas 0.8–1.2 mm long, awnless; palea keels pectinate-ciliate. Habitat: rocky slopes and sandy soils. Distribution: (Ge) tropical E Africa and Arabia.

129. *Eragrostis minor* Host

FIGURE 138

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

Caespitose annuals. Culms 5–50 cm tall, erect, geniculate; internodes glabrous, semiterete in cross section, ribbed; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy, margins hairy; oral hairs present; ligule a ciliate membrane; blades 3–10 cm long, 1–3 mm wide, linear, hairy on basal ⅓, flat, spreading, flaccid, glabrous, margins with crateriform glands or eglandular, bases narrow, apex acuminate. Panicles open, 4–20 cm long, ovate, dense or loose; branches stiff, eglandular or glandular; pedicels usually with glandular bands. Spikelets 3–15 mm long, 1.3–2 mm wide, 8–16-flowered, oblong, laterally compressed; lemmas 1.6–2 mm long, awnless. Habitat: wet places and a weed of cultivation. Distribution: (Nv, Ol, S) subtropics and warm temperate Old World.

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

FIGURE 139

Eragrostis pilosa (L.) P. Beauv., Ess. Agrostogr. 71, 162, 175. 1812. Common names: *heilagoug*; Indian lovegrass.

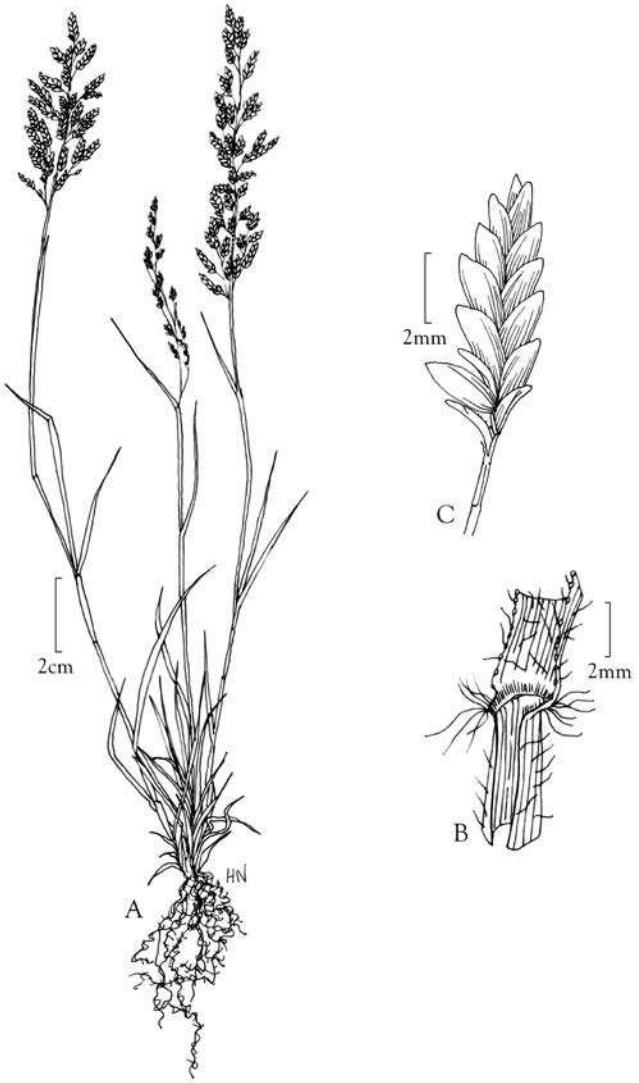


FIGURE 138. *Eragrostis minor*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *E. Baltars 3427* (US-2577113A).

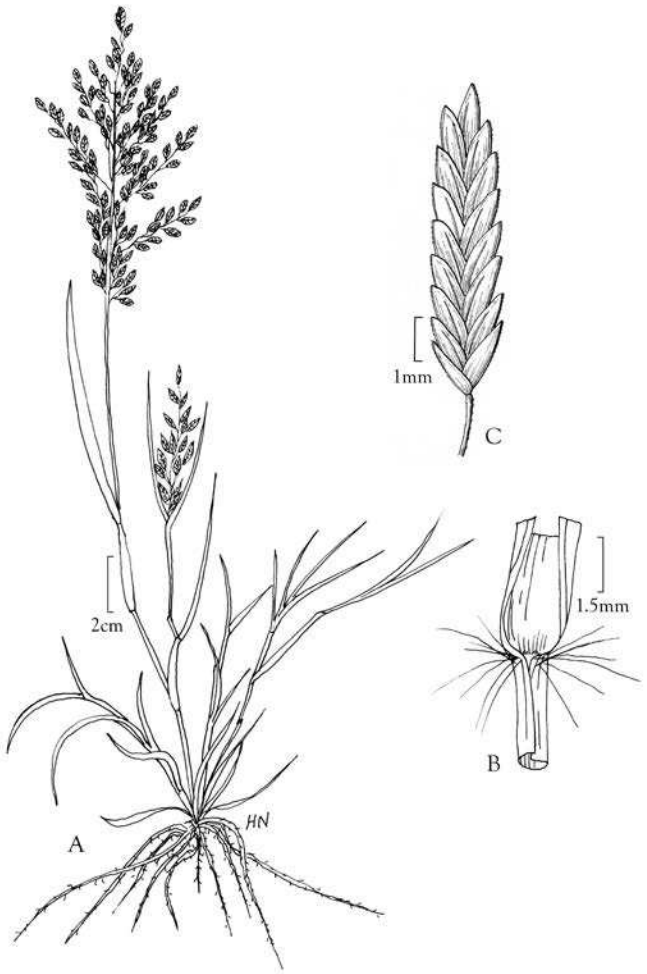


FIGURE 139. *Eragrostis pilosa*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *H. A. Allard 21862* (US-2236901); C modified from Peterson (2003).

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

131. *Eragrostis sarmentosa** (Thunb.) Trin.

FIGURE 140

*Eragrostis sarmentosa** (Thunb.) Trin., Mém. Acad. Imp. Sci. Saint-Pétersbourg, sér. 6, Sci. Math. 1(4): 398. 1830.

Mat-forming, caespitose perennials; long stolons present; rhizomes less than 3 mm long, short. Culms 15–40 cm tall, erect, geniculate; internodes glabrous; lower nodes rooting; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous, margins membranous; oral hairs present; ligule a ciliate membrane; blades 5–10 cm long, 1–4 mm wide, linear, flat, reflexed, glabrous, margins scabrous, bases narrow, apex acuminate. Panicles 2.5–10 cm long, contracted, interrupted below, linear; primary branches appressed. Spikelets 3–7 mm long, 1.5–1.7 mm wide,

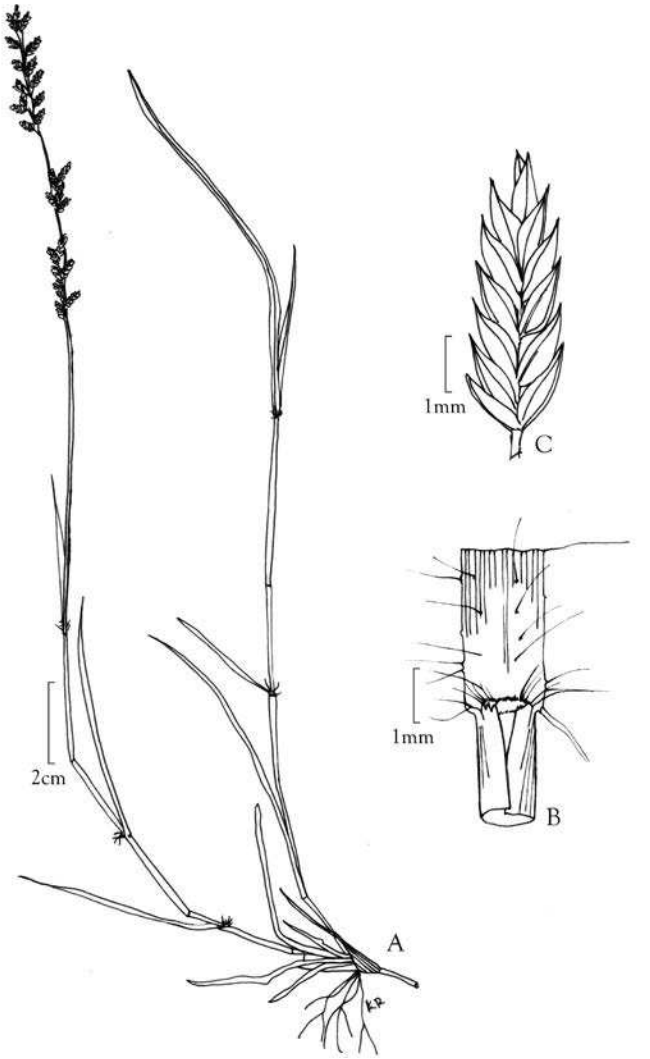


FIGURE 140. *Eragrostis sarmentosa*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *S. Laegaard 15920* (US-3292338).

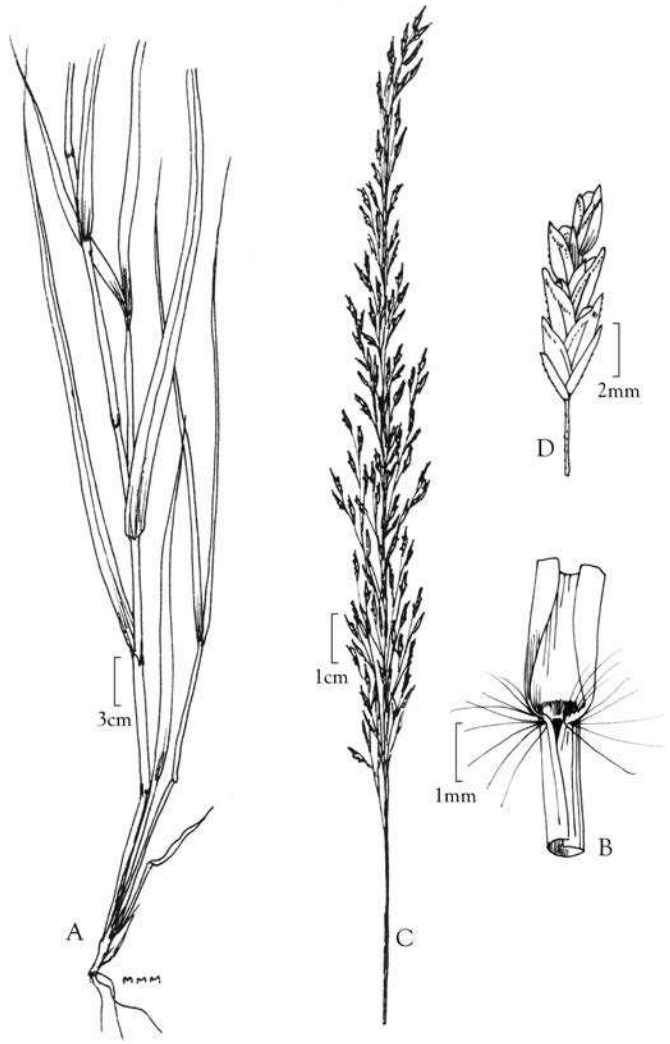


FIGURE 141. *Eragrostis tef*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from *Persson s.n.* (CAI); B, D drawn from *T. Ebba 57* (US-2464392).

6–8-flowered, linear or oblong; laterally compressed; lemmas 1.4–1.5 mm long, awnless. Habitat: introduced. Distribution: (Ms) S Africa, tropical Asia.

132. *Eragrostis tef* (Zucc.) Trotter

FIGURE 141

Eragrostis tef (Zucc.) Trotter, Boll. Soc. Bot. Ital. 1918: 62. 1918. Common names: ruby silk lovegrass, teff.

Caespitose annuals. Culms 15–70 cm tall, erect, geniculate, glabrous; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy on the upper ⅓, ribbed, margins smooth; ligules 1–2 mm long, a ciliate membrane; blades 10–25 cm long, 1–3 mm wide, linear, conduplicate, spreading, reflexed, scaberulous, margins scabrous, bases narrow, apex acuminate. Panicles 10–40 cm long, open or contracted, lanceolate or ovate; primary branches whorled at lower nodes. Spikelets 5.5–9 mm long, 1.5–2 mm wide, 4–16-flowered, oblong, laterally compressed; lemmas 1.6–3 mm long, awnless.

Habitat: an escape from cultivation. Distribution: (Nv, Ol) Ethiopia.

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

FIGURE 142

*Eragrostis tenella**, Syst. Veg. 2: 576. 1817. [*Eragrostis amabilis* (L.) Wight & Arn.; *Poa amabilis* L.]
Common name: Japanese lovegrass.

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

134. *Eragrostis tenuifolia* (A. Rich.) Hochst ex Steud.

FIGURE 143

Eragrostis tenuifolia (A. Rich.) Hochst ex Steud., Syn. Pl. Glumac. 1: 268. 1854.
Common names: elastic grass, wiry lovegrass.

Caespitose perennials. Culms 30–70 cm tall, erect, geniculate, glabrous, ribbed; butt sheaths glabrous. Leaves basal and cauline; sheaths open, keeled, glabrous, ribbed, margins sparsely hairy; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 4–20 cm long, 2–4 mm wide, linear, conduplicate,

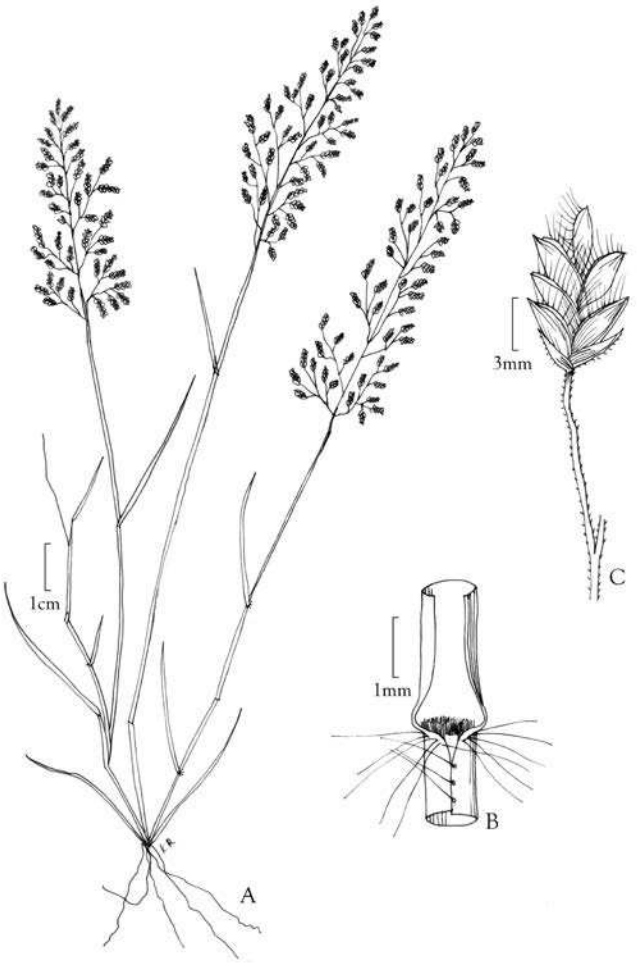


FIGURE 142. *Eragrostis tenella.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *J. W. Helfer 160* (CAI); B, C drawn from *S. Lægaard 15857* (US-3292354).

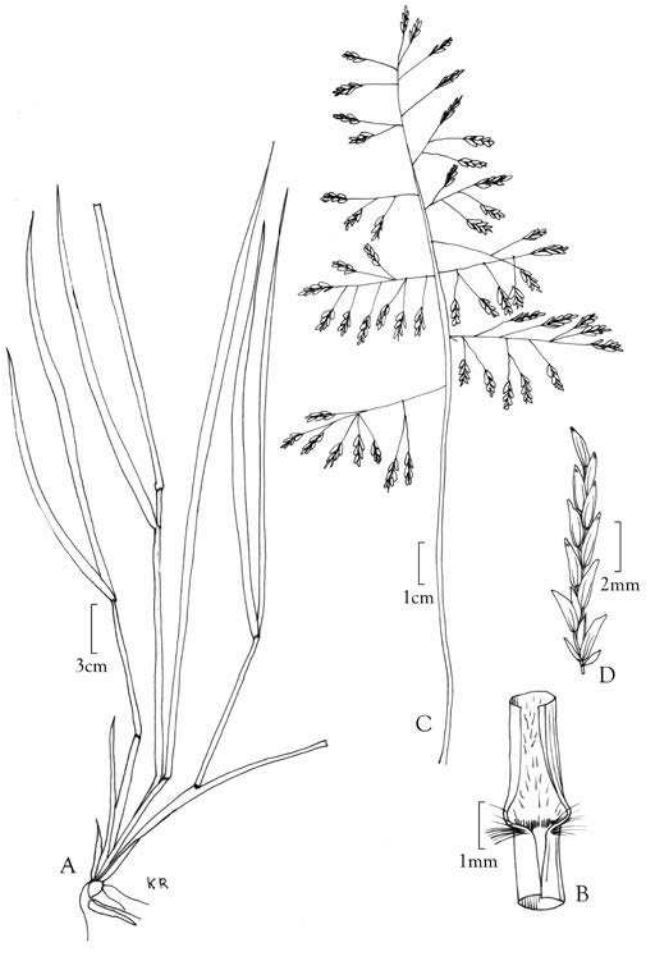


FIGURE 143. *Eragrostis tenuifolia.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *A. Pappi 9398* (US-2874952).

spreading, reflexed, glabrous, margins cartilaginous, bases narrow, apex acuminate. Panicles 5–20 cm long, open, elliptic, terminal; branches glabrous or bearded in axils. Spikelets 4–16 mm long, 1–3 mm wide, 6–14-flowered, linear, strongly laterally compressed, breaking up at maturity; lemmas 1.2–2.5 mm long, awnless. Habitat: sandy soils, usually in wet areas, roadsides, often in disturbed habitats. Distribution: (Nv) tropical Africa.

135. *Eragrostis tremula** Hocht & Steud.

FIGURE 144

*Eragrostis tremula** Hocht & Steud., Syn. Pl. Glumac. 1: 269. 1854.

Common names: *bano, bannu*.

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

136. *Eremopyrum bonaepartis* (Spreng.) Nevski

FIGURE 145

Eremopyrum bonaepartis (Spreng.) Nevski, Trudy Bot. Inst. Akad. Nauk S.S.S.R., ser. 1, Fl. Sist. Vyssh. Rast. 1: 18. 1933.

Common name: tapertip false wheatgrass.

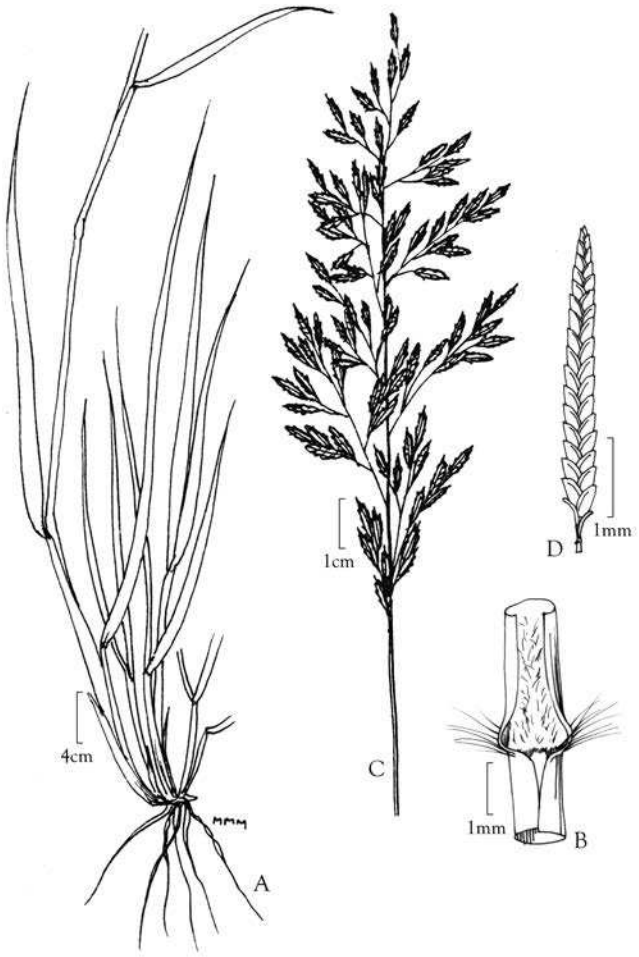


FIGURE 144. *Eragrostis tremula.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from *K. Ibrahim 1707* (CAI); B, D drawn from *W. A. Archer 9398* (US-2236337).

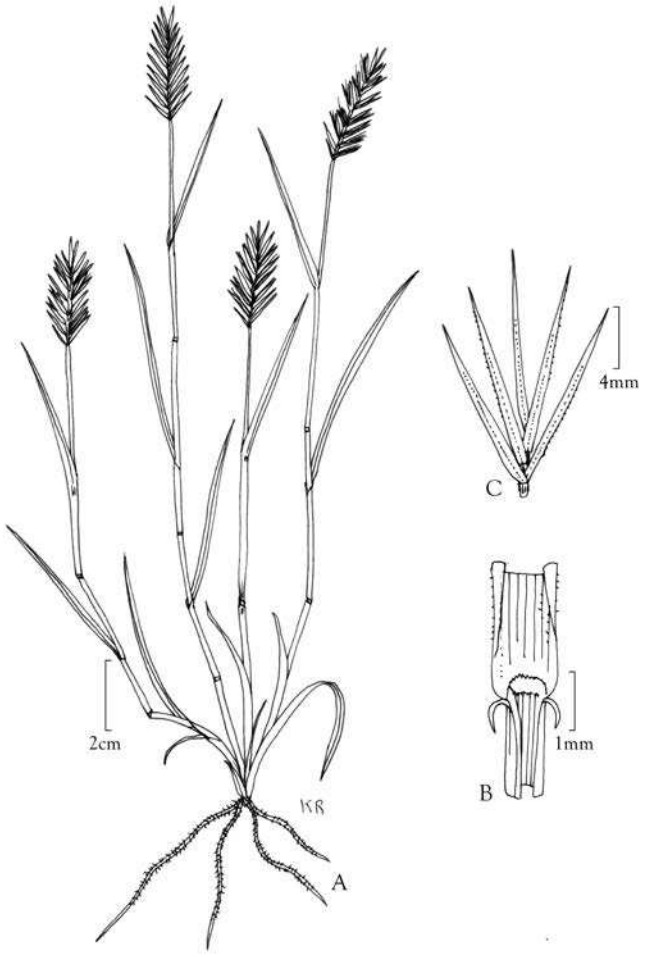


FIGURE 145. *Eremopyrum bonaepartis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *N. El Hadidy, Amal Hosny, Azza El Hadidi s.n.* (CAI); B, C drawn from *L. E. Long 302* (US-2209724).

Caespitose annuals. Culms 10–30 cm tall, erect, geniculate or decumbent; internodes glabrous, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy, margins hairy; auricles falcate; ligules 2–3 mm long, decurrent, membranous, apex erose; blades 5–10 cm long, 3–8 mm wide, lanceolate, flat, ascending, scabrous, margins scabrous, apex acuminate. Spikes 1.5–4 cm long, 4–18 mm wide, single, oblong, bilateral; rachis fragile at the nodes. Spikelets 15–20 mm long, oblong, laterally compressed; lemmas 5–7.5 mm long, unawned or short awned, the awns up to 3 mm long. Habitat: rocky slopes. Distribution: (S) SW and C Asia.

137. *Eremopyrum distans** (K. Koch) Nevski

FIGURE 146

*Eremopyrum distans** (K. Koch) Nevski, Trudy Bot. Inst. Akad. Nauk S.S.S.R., ser. 1, Fl. Sist. Vyssh. Rast. 1: 18. 1933.

Caespitose annuals. Culms 8–20 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, ribbed, margins membranous; auricles falcate; ligules 1–3 mm long, decurrent, membranous, apex erose; blades 6–8 cm long, 2–3 mm wide, linear, flat, appressed, glabrous or pubescent, margins scabrous, bases narrow, apex acuminate. Spikes 2.5–5 cm long, 15–25 mm wide, single, oblong, bilateral; rachis fragile at the nodes. Spikelets 15–25 mm long, oblong, laterally compressed; glumes 6–7 mm long, 1-awned; principal lemmas as long or slightly exceeding the glumes, awns 5–7 mm long; paleae mucronate to short awned, the awns up to 1.5 mm long. Habitat: weed of cultivation. Distribution: (S) SW and C Asia.

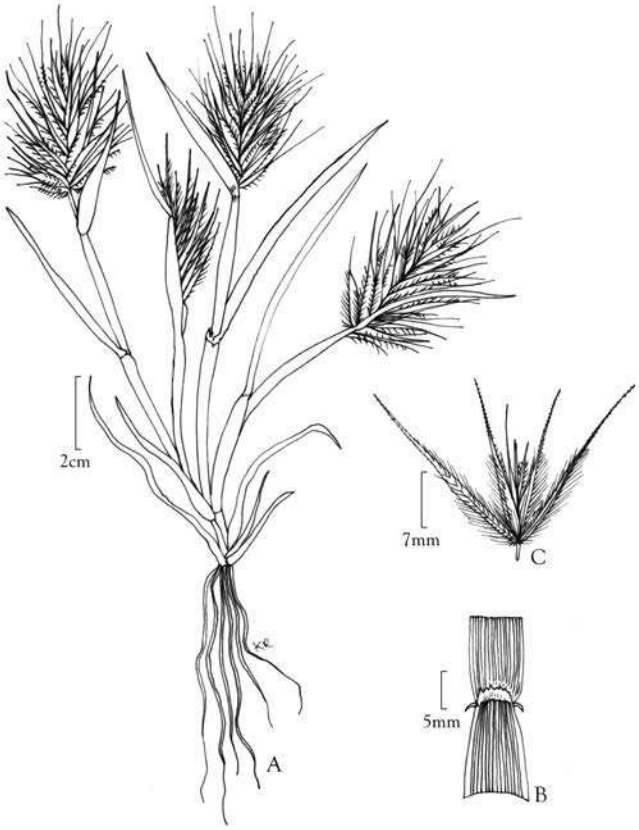


FIGURE 146. *Eremopyrum distans.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *S. Collenette 4584* (CAI); B, C drawn from *A. Nechelson* (US-1063471).

138. *Festuca brevis* (Boiss. & Kotschy) Asch., Schweinf. & Muschl.

FIGURE 147

Festuca brevis (Boiss. & Kotschy) Asch., Schweinf. & Muschl., Man. Fl. Egypt 1: 138. 1912. [*Vulpia brevis* Boiss. & Kotschy.]

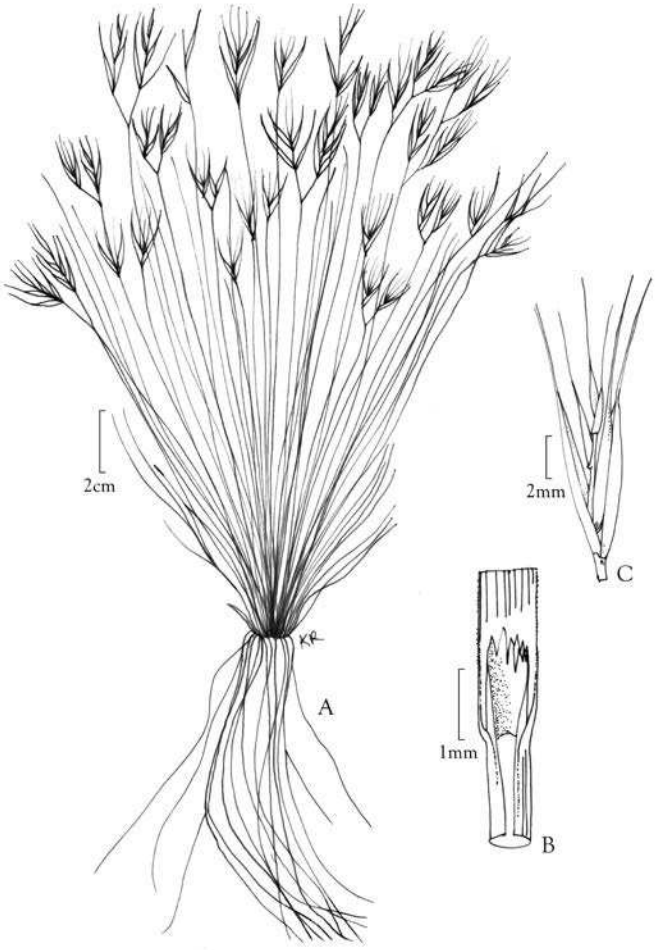


FIGURE 147. *Festuca brevis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *A. Letourneux 63* (US-1006640).

Solitary dwarf annuals. Culms 3–10 cm tall, erect, geniculate; internodes glabrous, ridged; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, ribbed, margins hairy; ligules 1–2 mm long, membranous, serrate, decurrent; blades 3–10 cm long, 1–2 mm wide, linear, involute, ascending, flaccid, scaberulous, margins glandular, apex acuminate. Panicles 2–6 cm long, 0.8–1.5 cm wide, 1-sided, dense, contracted, oblong, partially included in the upper sheath. Spikelets 7–10 mm long, in threes, cuneate, laterally compressed; glumes 7–8 mm long, 1-awned; lemmas 6–7 mm long, awns 5–10 mm long, straight, bristly. Habitat: sandy fields often derived from calcareous bedrock. Distribution: (Mm, Ms, Nv) N Africa.

139. *Festuca bromoides* L.

FIGURE 148

Festuca bromoides, Sp. Pl. 1: 75. 1753. [*Vulpia bromoides* (L.) Gray.]

Common names: brome fescue, silver grass.

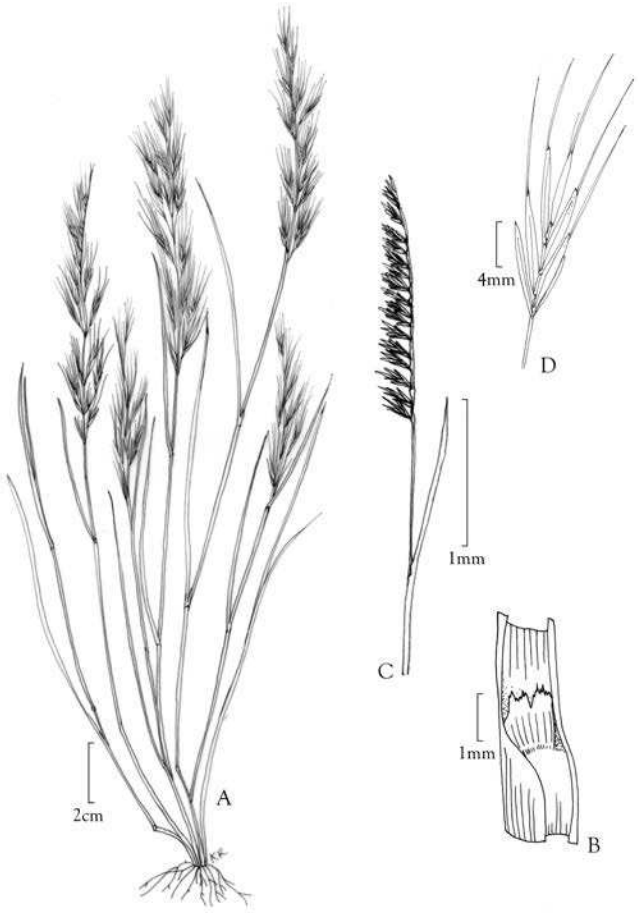


FIGURE 148. *Festuca bromoides*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *M. Drar 456* (CAI); B–D drawn from *H. F. Mooney 6348* (US-2907068), *R. F. Hoover 501* (US-1984518).

Solitary or caespitose annuals. Culms 5–50 cm tall, erect, geniculate, weak; internodes glabrous, ridged; nodes dark; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, margins entire; ligules 0.5 mm long, membranous, apex truncate; blades 1–15 cm long, 0.5–3 mm wide, linear, involute, ascending, flaccid, pubescent, margins scaberulous, apex acuminate. Panicles 1–10 cm long, sparsely branched, 1-sided, dense, open or contracted, lanceolate or oblong, partially included in the upper sheath. Spikelets 7–14 mm long, solitary, oblong, or cuneate, laterally compressed; lemmas 5–10 mm long, awns 5–12 mm long, straight, bristly. Habitat: weed of cultivation and waste places. Distribution: (Mm, unconfirmed) S Europe and temperate Asia.

140. *Festuca fasciculata Forssk.*

FIGURE 149

Festuca fasciculata Forssk., Fl. Aegypt.-Arab. 22. 1775. [*Vulpia fasciculata* (Forssk.) Samp.]

Common name: dune fescue.

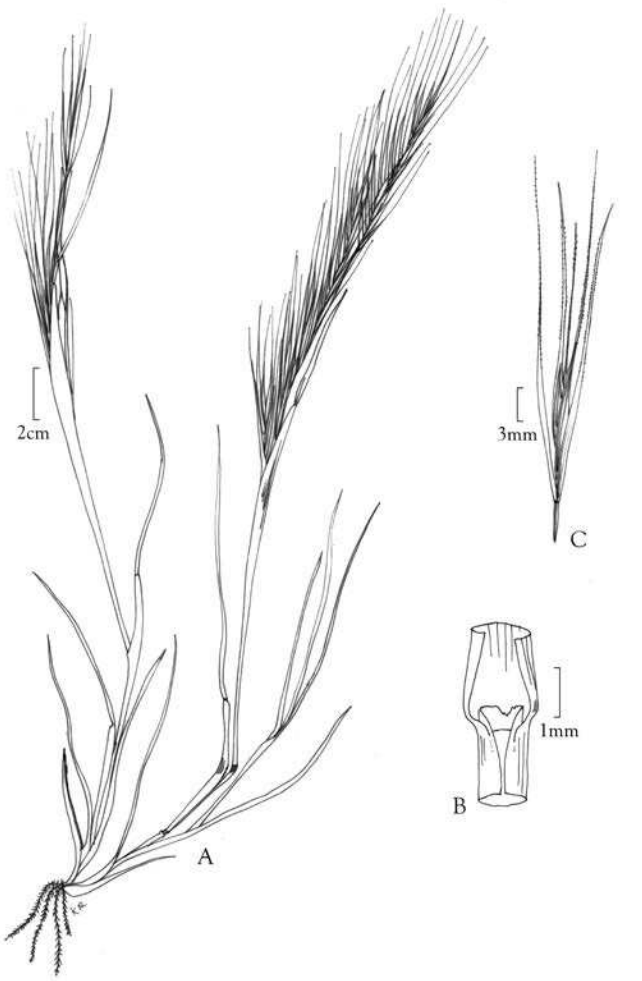


FIGURE 149. *Festuca fasciculata*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *B. Balansa s.n.*(US-1126373).

Caespitose annuals. Culms 10–50 cm tall, erect, geniculate, weak, wiry; internodes glabrous, ridged; nodes dark; butt sheaths glabrous. Leaves basal and cauline, open, glabrous, ribbed, margins membranous; ligules 1–2 mm long, membranous, apex obtuse, decurrent; blades 3–10 cm long, 1–2.5 mm wide, linear, conduplicate, spreading, flaccid, ribbed, hairy on basal ⅓, margins scabrous, apex acuminate. Panicles 2–12 cm, 1-sided, dense, contracted, oblong, partially included in upper sheath. Spikelets 12–16 mm long, solitary, oblong, or cuneate, laterally compressed; lemmas 8–18 mm long, awns 6–16 mm long, straight, bristly. Habitat: sandy fields. Distribution: (Mm, Ms, Nv) W Europe and Mediterranean region eastward to Caucasia.

141. *Festuca myuros* L.

FIGURE 150

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

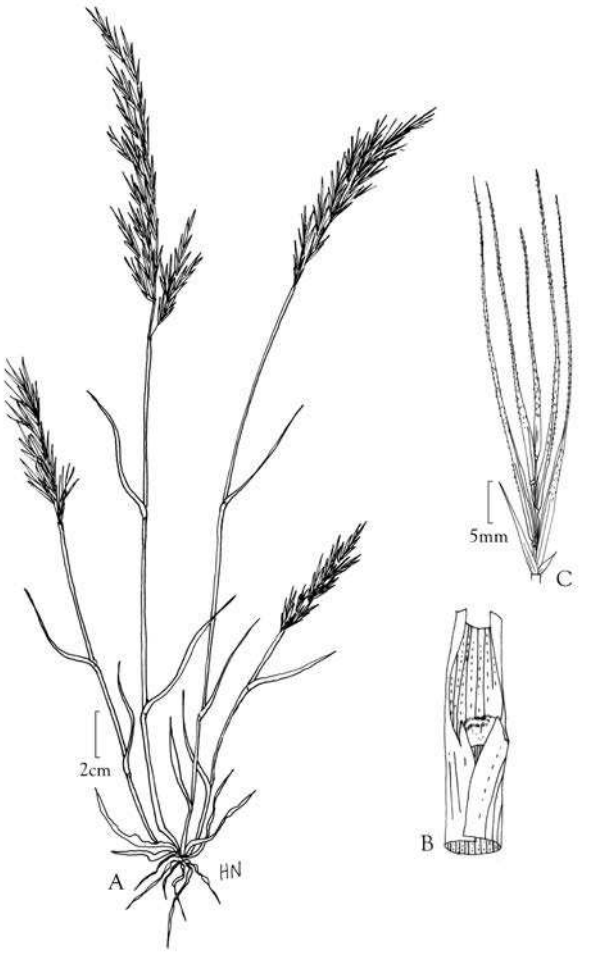


FIGURE 150. *Festuca myuros*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *F. J. Hermann 10533* (US-2146187); C modified from Hitchcock (1951).

Caespitose annuals. Culms 10–60 cm tall, erect, geniculate, wiry; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; ligules 0.3–1 mm long, membranous, apex obtuse; blades 3–10 cm long, 0.5–2.5 mm wide, linear-filiform, involute, curly, ascending, flaccid, pubescent, margins scabrous, apex acuminate. Panicles 5–30 cm long, often 1-sided, exserted or embraced at base by subtending sheaths. Spikelets 7–10 mm long, solitary, partially included in sheath, oblong or cuneate, laterally compressed; lemmas 4.5–7.5 mm long, awns 5–15 mm long, straight, bristly. Habitat: sandy soils. Distribution: (Mm, S) Europe and temperate Asia.

142. *Festuca pectinella* Delile

FIGURE 151

Festuca pectinella Delile, Ind. Sem. Hort. Monsp. 24. 1836. [*Vulpia pectinella* (Delile) Boiss.]
Common name: *sobbeila*.

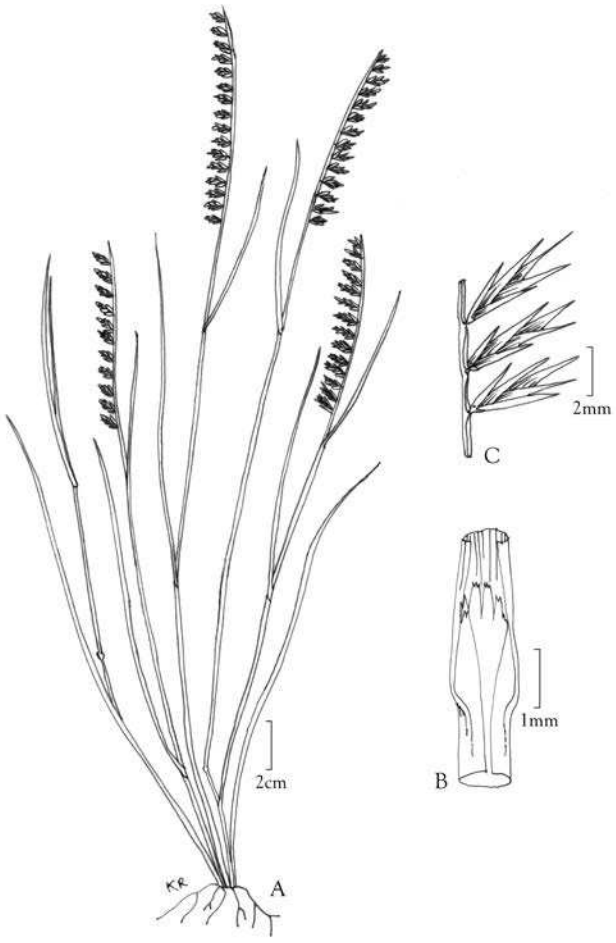


FIGURE 151. *Festuca pectinella*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *G. Lopez & F. M. Garmedia* (US-3527514).

Solitary annuals. Culms 5–15 cm tall, erect, geniculate, weak, wiry; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline, sheaths flattened, open, glabrous, margins membranous; auricles clawlike; ligules 1–2 mm long, membranous, apex obtuse; blades 1–10 cm long, 0.5–1 mm wide, filiform, involute, spreading, curly, scabrous, margins scabrous, apex acuminate. Panicles 2–3 cm long, 1-sided, pectinate, single, straight or arcuate, unilateral. Spikelets 4–6 mm long, solitary, cuneate, laterally compressed; lemmas about 3 mm long, mucronate, awnless. Habitat: sandy fields. Distribution: (Mm, Ms, Di, S) N Africa, Syria, and Palestine.

143. *Gastridium phleoides* (Nees & Meyen) C. E. Hubb.

FIGURE 152

Gastridium phleoides (Nees & Meyen) C. E. Hubb., Kew Bull. 9: 375. 1954. [*Lachnagrostis phleoides* Nees & Meyen.]
Common name: nit grass.

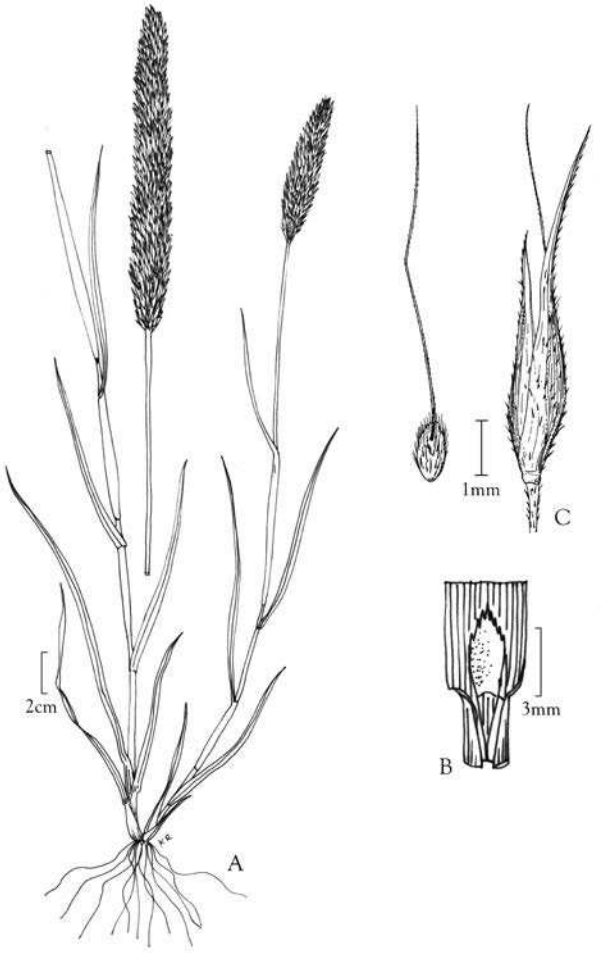


FIGURE 152. *Gastridium phleoides.* A. Habit. B. Ligule, sheath, and blade. C. Enlarged floret (left) and spikelet (right). A–C drawn from *R. J. Soreng 3802* (US-3561052).

Solitary annuals. Culms 10–50 cm tall, erect, geniculate; internodes glabrous, ribbed; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins entire; ligules 6–7 mm long, membranous, apex acute; blades 2–10 cm long, 1–3 mm wide, linear, flat, ascending, flaccid, scaberulous on both sides, margins entire, apex acute. Panicles 5–18 cm long, 0.5–1.5 cm wide, spiciform, lanceolate to oblong. Spikelets 5–7.5 mm long, oblong, laterally compressed; lemmas 1–1.3 mm long, awns 5–7 mm long, geniculate, twisted, scabrous.

Habitat: sandy soils. Distribution: (Mm) Mediterranean and tropical E Africa.

144. *Halopyrum mucronatum* (L.) Stapf

FIGURE 153

Halopyrum mucronatum (L.) Stapf, Hooker's Icon. Pl. 25: t. 2448. 1896.

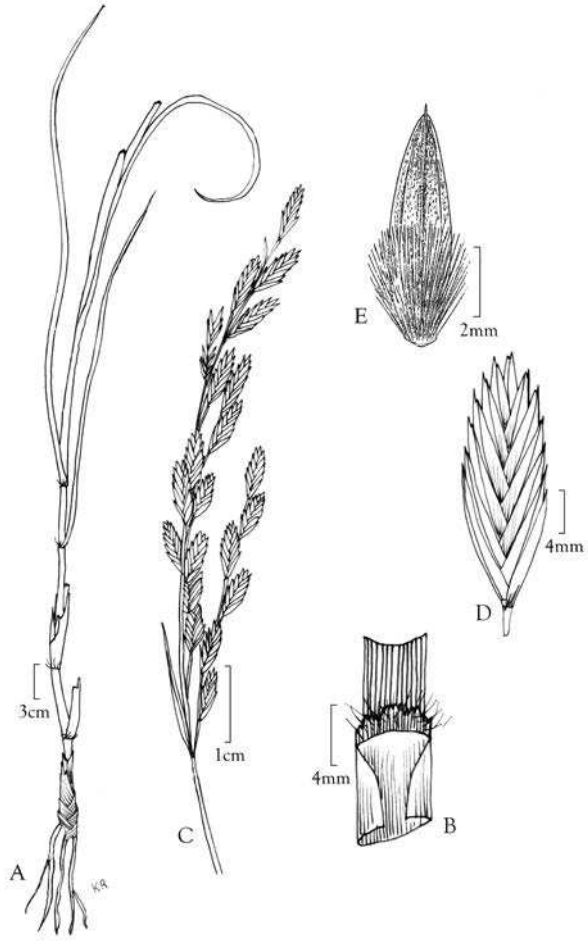


FIGURE 153. *Halopyrum mucronatum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. E. Lemma. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran 640 & 1111* (CAI); B–D drawn from *M. Mandaville 31* (US-2379493); E modified from Cope (2005).

Caespitose perennials; stolons present. Culms 60–100 cm tall, woody, hairy, erect; internodes glabrous; butt sheaths fibrous, glabrous. Leaves basal and cauline; sheaths glabrous, margins entire; ligule a fringe of hairs; blades 10–40 cm long, 2–10 mm wide, filiform, involute, appressed, curly, glabrous, ribbed, margins entire, apex attenuate. Panicles 10–40 cm long with 3–10 unilateral branches borne along a central axis; branches bearing 3–7 fertile spikelets; rachis angular. Spikelets 12–26 mm long, 5–7 mm wide, 8–25-flowered, ovate, laterally compressed, packed broadside to the rachis; lemmas 7.5–8.5 mm long, coriaceous, apex acute or mucronate, awnless. Habitat: coastal sandy dunes along the Red Sea. Distribution: (Ge) shores of Indian Ocean from Mozambique to Sri Lanka.

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

FIGURE 154

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

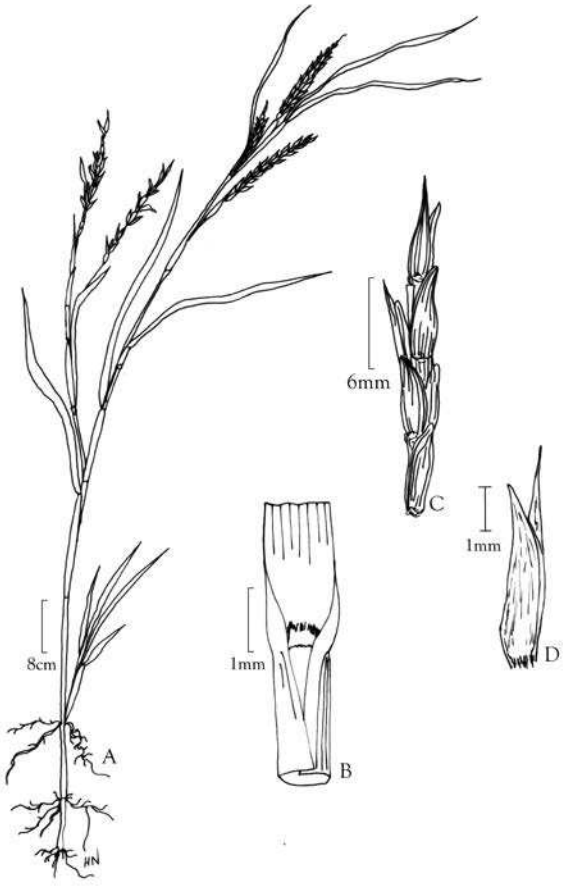


FIGURE 154. *Hemarthria altissima*. A. Habit. B. Ligule, sheath, and blade. C. Segment of inflorescence. D. Spikelet. A drawn from *N. El Hadidi s.n.* (CAI); B–D drawn from *A. J. Oakes 1517* (US-3030926); B modified from Allen (2003a).

Common names: *hasheesh dakar, hasheesh shami, roqeyba*; limpograss.

Caespitose perennials; stolons present. Culms up to 250 cm tall, decumbent or prostrate; internodes glabrous; lower nodes rooting, bearded, dark; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy on the upper ⅓, margins entire; collars hairy, ciliate; ligules 1–2 mm long, ciliate membranes; blades 5–15 cm long, 2–4 mm wide, linear, flat, spreading, flaccid, glabrous, margins cartilaginous, apex acute. Racemes 4–10 cm long, single, erect, partially enclosed in sheaths, smooth; rachis fracturing into irregular segments, flattened, margins glabrous; internodes cuneate. Spikelets 4–6 mm long, in pairs, lanceolate, dorsally compressed; lemmas awnless. Habitat: moist places bordering streams and lakes, usually in water or mud. Distribution: (Mm, Ms, Nv, Nn) S Europe southward to the cape.

146. *Holcus annuus** Salzm. ex C. A. Mey.

FIGURE 155

*Holcus annuus** Salzm. ex C. A. Mey., Verz. Pfl. Casp. Meer. 17. 1831.

Common name: annual fog.

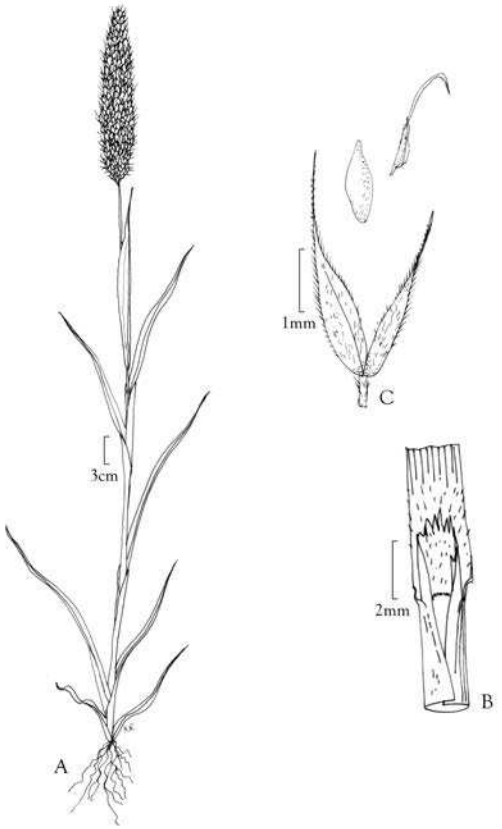


FIGURE 155. *Holcus annuus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet showing floret detached from glumes. A–C drawn from *R. J. Soreng, R. Zarco, J. Arroyo 3642* (US-3565387).

Caespitose annuals. Culms 20–100 cm tall, erect, geniculate; internodes glabrous; nodes pubescent; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, pubescent, margins entire; ligules 4 mm long, membranous, apex lacerate, erose; blades 2–8 cm long, 1–2 mm wide, linear, flat, hairy on both sides, margins entire, bases narrow, apex acute. Panicles 5–8 cm long, erect, terminal, compact, elliptic. Spikelets 3–5 mm long, strongly laterally compressed, elliptic; glumes mucronate or short awned, the awns 1–2.5 mm long; lemmas 1.5–2 mm long, cartilaginous, upper sterile lemma awned, the awns 2–3 mm long, terminal, straight. Habitat: sandy soils, introduced. Distribution: (Mm, Nv) Mediterranean region.

147. *Hordeum marinum* Huds.

FIGURE 156

Hordeum marinum Huds., Fl. Angl., ed. 2, 1: 57. 1778.
Common names: *bohma; sha'iriya*; sea barley.

Solitary annuals. Culms 10–60 cm tall, erect, geniculate, weak; internodes glabrous, ribbed; butt sheaths sparsely hairy. Leaves basal and cauline; sheaths hairy, margins smooth; auricles clawlike; ligules 1 mm long, membranous, apex truncate; blades 5–15 cm long, 3–8 mm long, linear, flat, flaccid, spreading, glabrous, margins scabrous, apex acute. Spikelike racemes 2–6 mm long, simple, oblong or ovate, bilateral, partially included in the sheath; rachis fragile at the nodes, flattened. Spikelets 6–8 mm long, lanceolate, dorsally compressed, three at a node, packed broadside to rachis; lower glumes of the lateral spikelets winged or setaceous, appearing long awned; central lemmas 5–8 mm long, awned, the awns 10–24 mm long, straight, bristly. Habitat: sandy and alluvial soils. Distribution: (Mm, Ms, Nv, Ol) Europe, Mediterranean to SW and C Asia.

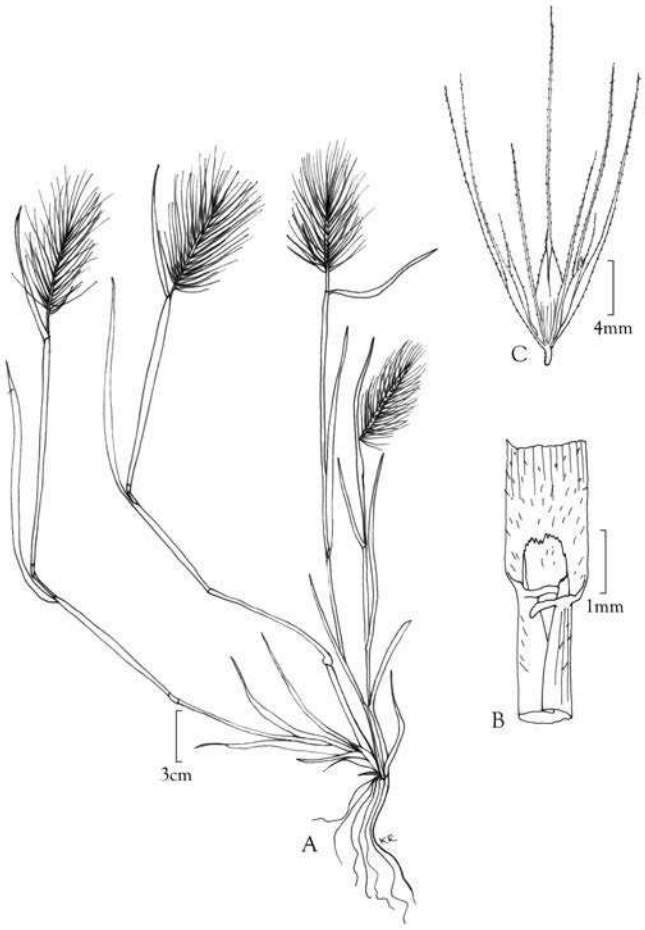


FIGURE 156. *Hordeum marinum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets (central and two laterals). A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *J. Vickery 10039* (US-2528313).

KEY TO THE SUBSPECIES

1a. Lower glumes of the lateral spikelets with a flattened wing, the wings 0.5–2.3 mm wide . . . . ***H. marinum* subsp. *marinum***
1a. Lower glumes of the lateral spikelets usually setaceous, not winged . . . . . ***H. marinum* subsp. *gussoneanum* (Parl.) Thell., Vierteljahrsschr. Naturf. Ges. Zürich 52: 441. 1908**

148. *Hordeum murinum* L.

FIGURE 157

Hordeum murinum L., Sp. Pl., ed. 1: 85. 1753.
Common names: *sha'eer el deep*; wall barley.

Solitary annuals. Culms 30–100 cm tall, erect, geniculate; internodes glabrous, ribbed; butt sheaths sparsely hairy or glabrous. Leaves basal and cauline; sheaths flattened, glabrous, margins smooth; auricles clawlike; ligules 1–2 mm long, membranous, apex truncate; blades 7–20 cm long, 2–8 mm wide, linear or lanceolate, flat, sparsely hairy, margins ciliate and/or scabrous, apex acute. Spikelike racemes 4–12 cm long, erect, single, linear or oblong, bilateral, partially included in the sheath; rachis fragile at the nodes, flattened; internodes 3–3.5 mm long, oblong, falling with spikelets above. Spikelets 7–12 mm long, lanceolate, dorsally compressed, 3 at a node; central lemmas 8–14 mm long, awns 15–25 mm long, straight, bristly. Habitat: sandy and alluvial soils. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, Ol, S) Mediterranean to Asia.

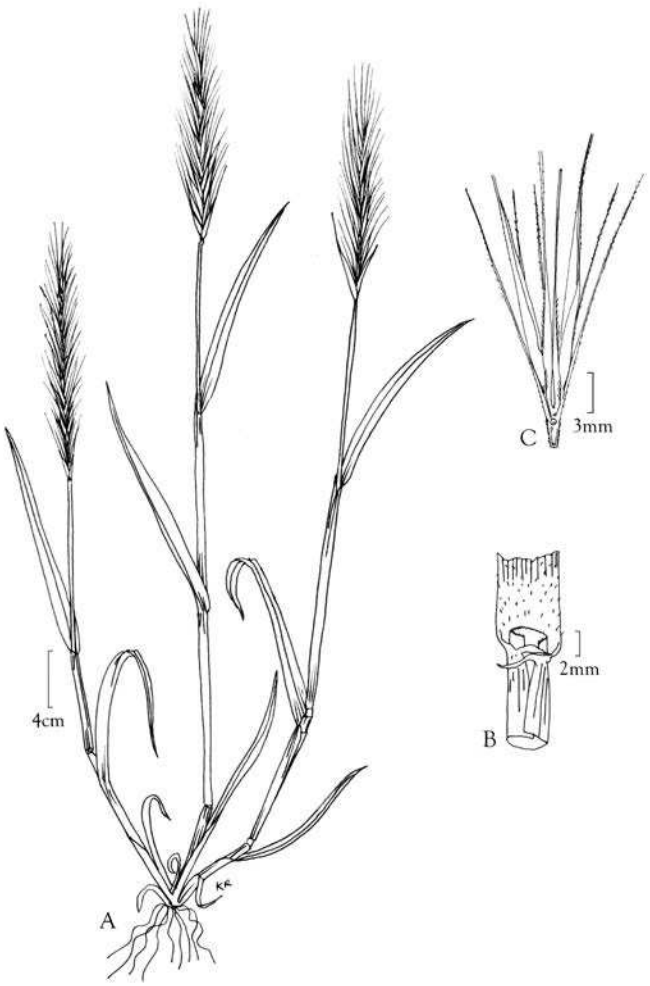


FIGURE 157. *Hordeum murinum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets (central and two laterals). A, B drawn from *C. F. Reed s.n.* (US-3049731); C modified from Von Bothmer et al. (2007).

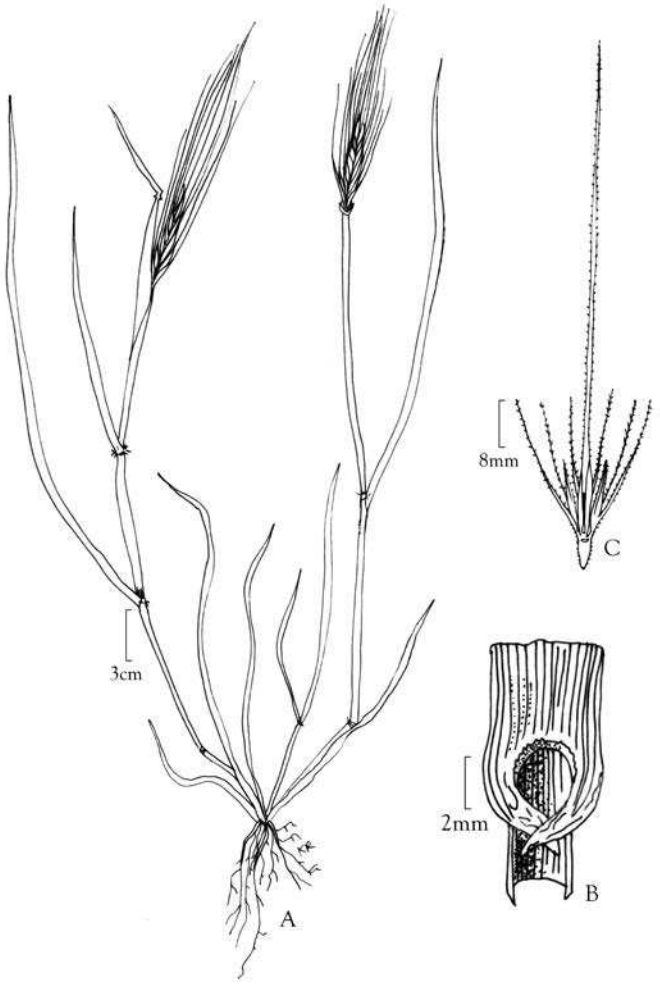


FIGURE 158. *Hordeum spontaneum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet triad. A drawn from *V. Täckholm, S. Sisi, M. Mahdi s.n.* (CAI); B, C drawn from *J. B. Gillett 15609* (US-2622681).

KEY TO THE SUBSPECIES

1a. Leaf blades green; anthers of central spikelets 0.7–1.4 mm long; rachilla extension of the lateral spikelets slender, green . . . . . ***H. murinum* subsp. *leporinum* (Link) Arcang., Comp. Fl. Ital. 805. 1882**

1b. Leaf blades glaucous; anthers of central spikelets 0.2–0.5 mm long; rachilla extension of the lateral spikelets stout, orangish brown . . . . . ***H. murinum* subsp. *glaucum* (Steud.) Tzvelev, Novosti Sist. Vyssh. Rast. 8: 67. 1971**

149. *Hordeum spontaneum* K. Koch

FIGURE 158

Hordeum spontaneum K. Koch, Linnaea 21: 430. 1848.
Common names: *shaeer bari*; barley wheat.

Caespitose or solitary annuals. Culms 30–70 cm tall, robust, erect; internodes glabrous; nodes dark; butt sheath glabrous. Leaves basal and cauline; sheaths, glabrous, ribbed, margins smooth; auricles clawlike; ligules 1–2 mm long, membranous, apex truncate; blades 5–15 cm long, 1–3 mm wide, linear, flat, flaccid, smooth, scaberulous, margins ciliate, apex acute. Spikelike racemes 4–9 cm long, 6–8 mm wide, simple, linear, bilateral, partially included in the sheath; rachis fragile at the nodes, flattened, ciliate on margins; internodes 3.5–5 mm long, oblong, falling with spikelets above. Spikelets 12–14 mm long, lanceolate,

dorsally compressed, 3 at a node, packed broadside to the rachis; glumes 1-awned, the awn 10–15 mm long; central lemmas 12–14 mm long, awns 4–14 cm long, straight, bristly. Habitat: sandy soils. Distribution: (Mm, Di) Mediterranean to C Asia.

150. *Hordeum vulgare** L.

FIGURE 159

*Hordeum vulgare** L., Sp. Pl. 1: 84, 85. 1753.
Common names: *sha'eer*; common barley.

Caespitose or solitary annuals. Culms 30–80 cm tall, erect, glabrous, ribbed; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy, ribbed, margins smooth, auricles clawlike; ligules 1–2 mm long, membranous, apex truncate; blades 8–40 cm long, 4–10 mm wide, linear, flat, reflexed, spreading, scabrous, margins smooth, apex acute. Spikelike racemes 3–8 cm long, bilateral, partially included in the sheath; rachis tough, flattened; internodes cuneate. Spikelets 10–15 mm long, cuneate, dorsally compressed, 3 at a node, packed broadside to the rachis, regular, 6-rowed; glumes 4–10 mm long, 1-awned; central lemmas 6–12 mm long, awns 8–14 mm long, straight, bristly. Habitat: cultivated. Distribution: (Mm, Nv, Nn, Di, S) throughout the world.

151. *Hyparrhenia hirta* (L.) Stapf

FIGURE 160

Hyparrhenia hirta (L.) Stapf, Fl. Trop. Afr. 9(2): 315. 1919.
Common names: *hemeira, sabat, safsoof*; thatching grass.

Caespitose perennials; rhizomes short. Culms 30–50 cm tall, weak, wiry, erect; internodes glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths flattened, margins hairy; ligules 2–3 mm long, membranous, apex erose, lacerate; blades

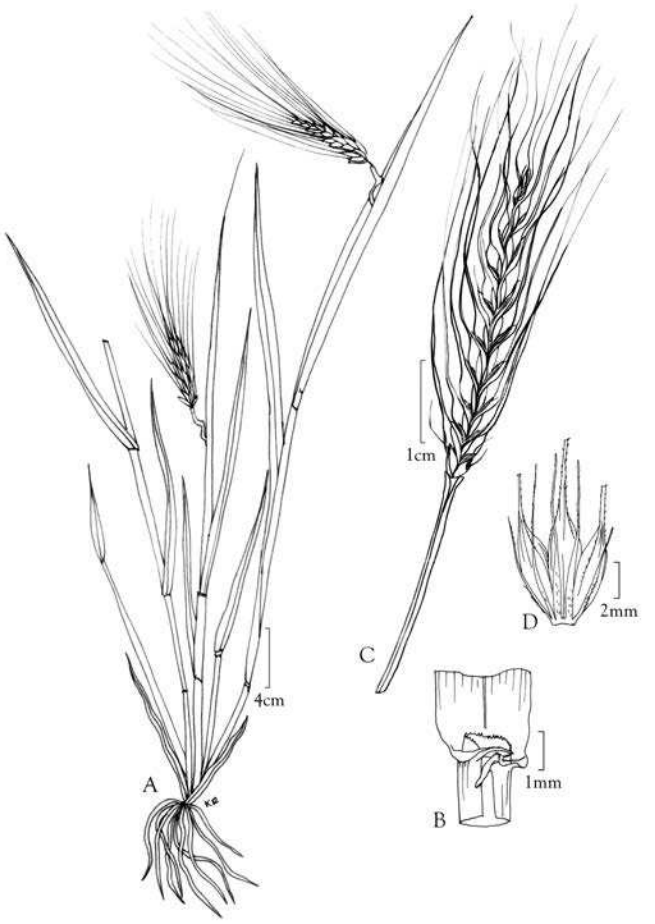


FIGURE 159. *Hordeum vulgare.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets (central and two laterals). A–C drawn from *P. Fleming 795* (US-3193000), *E. S. Steele s.n.* (US-364260); D modified from Von Bothmer et al. (2007).

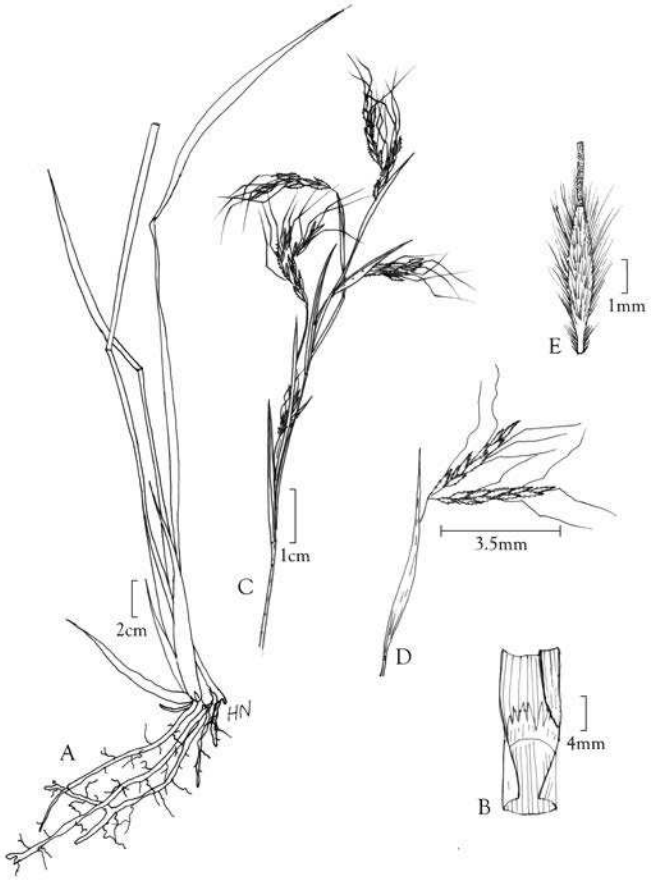


FIGURE 160. *Hyparrhenia hirta.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Segment of inflorescence. E. Spikelet. A, C drawn from *N. El Hadidi s.n.* (CAI); B, E drawn from *A. S. Hitchcock 24082* (US-1445876); D modified from Ibrahim and Kabuye (1988).

2–15 cm long, 1–2(–4) mm wide, linear, flat or conduplicate, stiff, firm, glaucous, scabrous, margins cartilaginous, apex attenuate. Racemes 2–4 cm long, in pairs, each bearing 4–7(–8) fertile spikelets, subtended by spatheoles, exserted; spatheoles 3–8 cm long, linear or lanceolate, membranous, reddish; peduncles 3–8 cm long, glabrous or pilose above; rachis fragile at the nodes, ciliate on margins, hairs white. Spikelets 4–6.5 mm long, in pairs, linear or elliptic, dorsally compressed; principal lemma awns 10–35 mm long, geniculate, twisted, bristly. Habitat: wadi beds, dry grasslands, and rocky slopes. Distribution: (Mm, Nv, Dg, Di, S, Ra) Mediterranean to S Africa and SW Asia.

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

FIGURE 161

*Imperata cylindrica** (L.) P. Beauv., Ess. Agrostogr. 8, 165, 177, pl. 5, f. 1. 1812.
Common names: *deil el-qott, halfa, silla*; cogongrass.

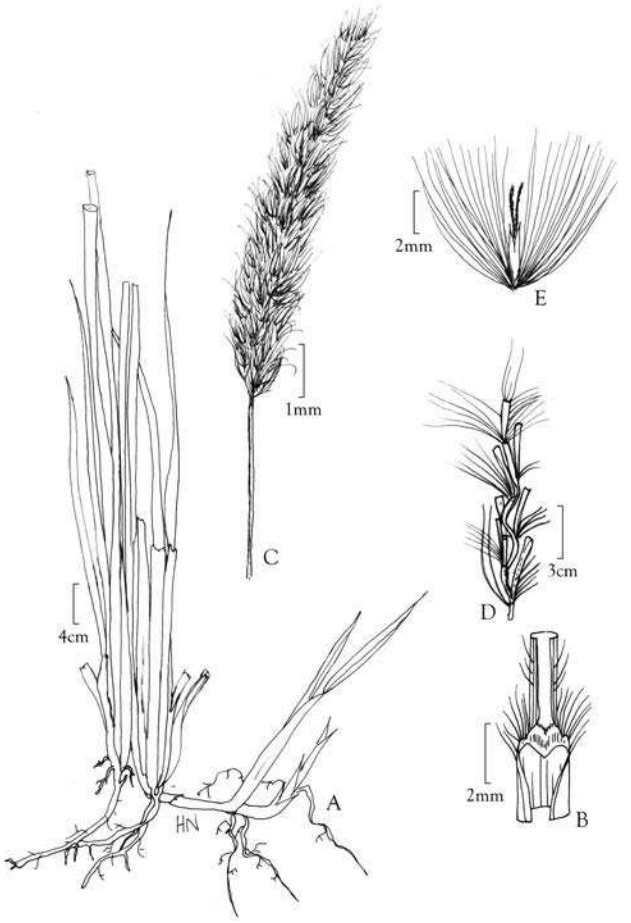


FIGURE 161. *Imperata cylindrica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Segment of inflorescence. E. Spikelet. A, C drawn from *L. Boulos s.n.* (CAI); B, D, E drawn from *J. Ash s.n.* (US-2819790).

Caespitose perennials; rhizomes elongated, scaly. Culms 10–100 cm tall, erect; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves mostly basal; sheaths hairy on the upper ⅓, margins sparsely hairy; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 3–80 cm long, 2–20 mm wide, linear, flat or conduplicate, ascending, scabrous, margins scaberulous, apex acute. Panicles 3–22 cm long, spiciform, linear; primary branches appressed to a central axis, with evident branchlets on axis, each branch bearing few fertile spikelets; rachis tough, subterete; internodes filiform. Spikelets 2.2–6 mm long, in pairs, lanceolate, subterete, falling entire; callus bearded, hairs white, base truncate; lower lemmas 1.4 mm long, awnless. Habitat: waste places, introduced. Distribution: (Mm, Ms, Nv, Nn, Dl, Dg, Di, Ol, S, Rz, Rq, Ra) tropical and warm temperate Old World, S America.

153. *Lagurus ovatus* L.

FIGURE 162

Lagurus ovatus L., Sp. Pl. 1: 81. 1753.
Common name: hare's-tail grass.

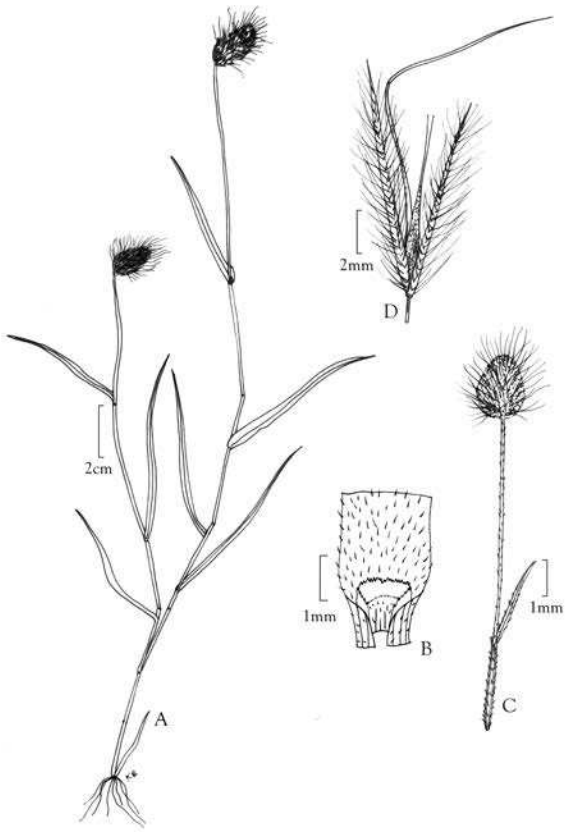


FIGURE 162. *Lagurus ovatus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm, S. Sisi and M. Mahdi s.n.* (CAI); B–D drawn from *C. Aurich & H. Forther* (US-3343374).

Solitary annuals. Culms 5–30 cm tall, erect; internodes pubescent, ribbed; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blades and adjacent nodes, flattened, keeled, pubescent, margins ciliolate; oral hairs present; ligules 1–3 mm long, ciliate membranes; blades 1–20 cm long, 2–10 mm long, linear-lanceolate, flat, appressed, straight, surfaces pilose on both sides, margins ciliate, apex acute. Panicles 1–7 cm long, 0.6–2 cm wide, capitate, oblong, ovate or globose. Spikelets 8–10 mm long, lanceolate, laterally compressed, breaking up at maturity, disarticulating below each fertile floret; callus pubescent; principal lemmas 3–5 mm long, half as long as the glumes, awned, the awns 8–18 mm long, geniculate with twisted column, feathery. Habitat: coastal sand. Distribution: (Mm) Mediterranean region.

154. *Lamarckia aurea* (L.) Moench

FIGURE 163

Lamarckia aurea (L.) Moench, Methodus 201. 1794.
Common name: goldentop grass.

Caespitose annuals; roots fibrous. Culms 8–40 cm tall, decumbent, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins membranous; ligules 6–8 mm long, membranous, apex acute; blades 3–20 cm long, 2–7 mm wide, linear, flat, spreading, flaccid, scabrous, margins smooth, apex acute. Panicles 3–6 cm long, secund, compact, ovate, gathered into a fascicle, axis bearing deciduous spikelet clusters; branches pilose. Spikelets 3–5 mm long, linear; flat, spreading, flaccid, subtended by involucres, ovate, laterally compressed; glumes 1 mm long, 1-awned; bisexual lemmas 2.4–3 mm long, awned, the awns 6 mm long, straight, scabrid. Habitat: sandy and stony habitats. Distribution: (Mm, Nv, Di) Micronesia to NE Africa and C Asia.

155. *Lasiurus scindicus* Henrard

FIGURE 164

Lasiurus scindicus Henrard, Blumea 4(3): 514. 1941.
Common names: *samaat, sewan*.

Caespitose perennials; rhizomes short, thick, woody, scaly. Culms 30–100 cm tall, erect, straight, often woody below; internodes glabrous; nodes dark; butt sheaths sparsely hairy. Leaves mostly basal; sheaths longer than blade, flattened, ribbed, hairy on the upper ⅓, margins smooth; ligule a fringe of hairs; oral hairs present; blades 8–30 cm long, 1–3(–6) mm wide, linear, involute, spreading, flaccid, glabrous, margins smooth, apex attenuate. Racemes 5–12 cm long, single, surrounded by hairs, partially included in the sheath; rachis fragile at the nodes, flattened, glabrous, pubescent or villous, ciliate on margins; rachis internodes cuneate, disarticulating horizontally. Spikelets 7–9 mm long, lanceolate, dorsally compressed, 3 at a node, falling as a unit; lemmas awnless. Habitat: coastal sand. Distribution: (Nv, Dg, Di, S, Ra, Ge) tropical E Africa to NW India.

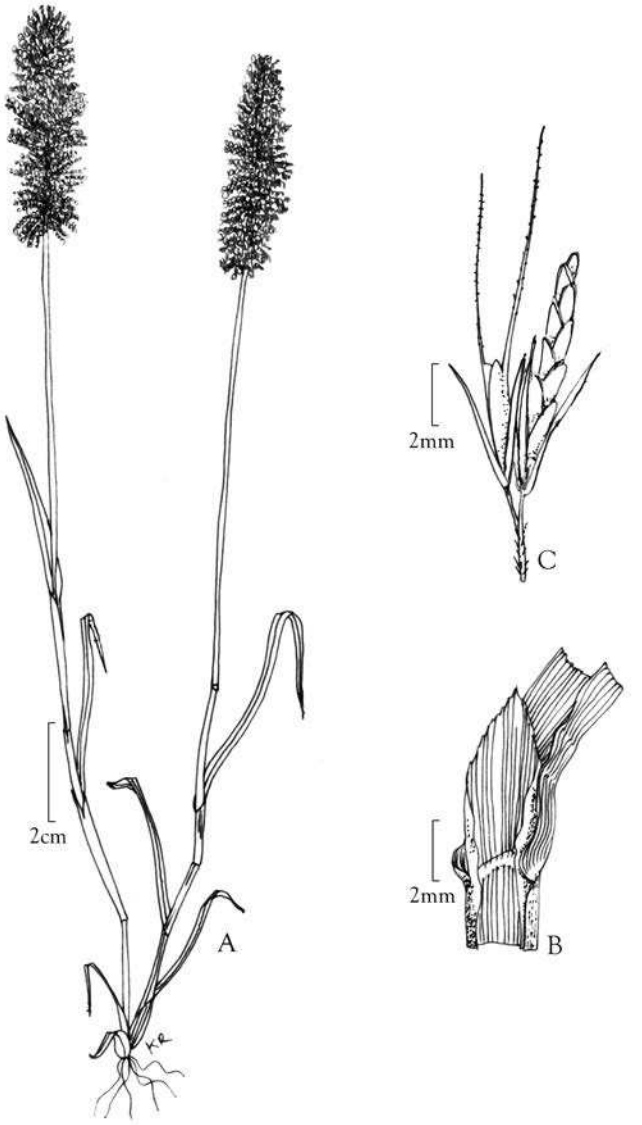


FIGURE 163. *Lamarckia aurea.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet pair, fertile (left) and sterile (right). A drawn from *T. Cope, G. Fahmy, I. El Garf 256* (CAI); B, C drawn from *G. Schweinfurth 1682* (US-822586).

156. *Leersia hexandra* Sw.

FIGURE 165

Leersia hexandra Sw., Prodr. 21. 1788.
Common names: *shillakh, sholleikh*; rice cut grass.

Mat-forming perennials; rhizomes elongated. Culms 20–100 cm tall, erect, geniculate; internodes pubescent; nodes bearded, lower rooting; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, margins smooth; auricles clawlike; ligules 1–2 mm long, membranous, apex acute; blades 5–20 cm

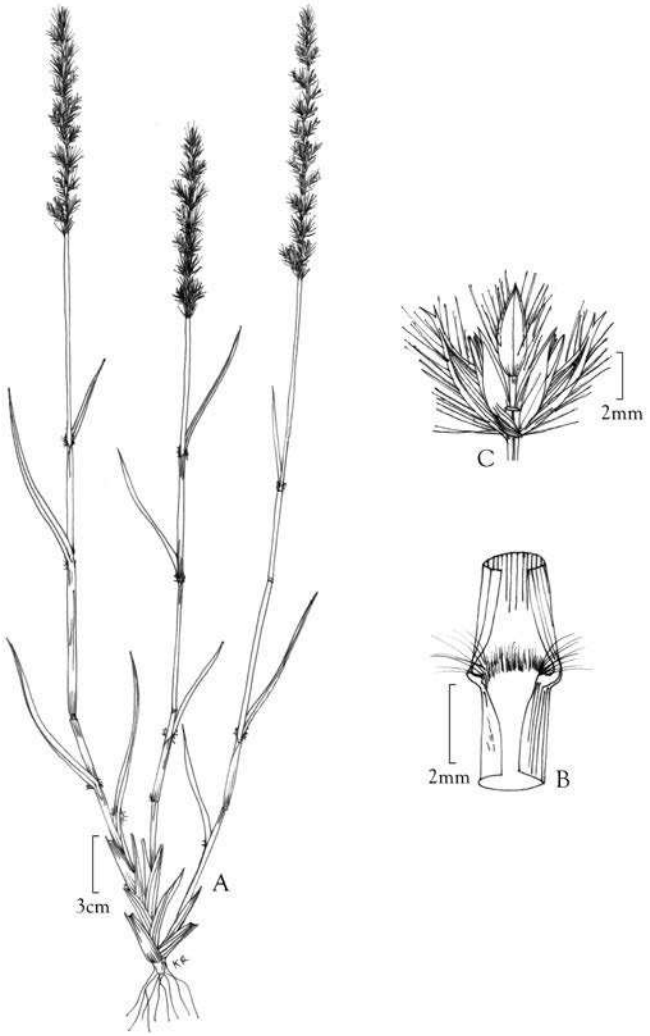


FIGURE 164. *Lasiurus scindicus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B, C drawn from *A. Rawi, R. Jalili and A. Amer s.n.* (US-2970973).

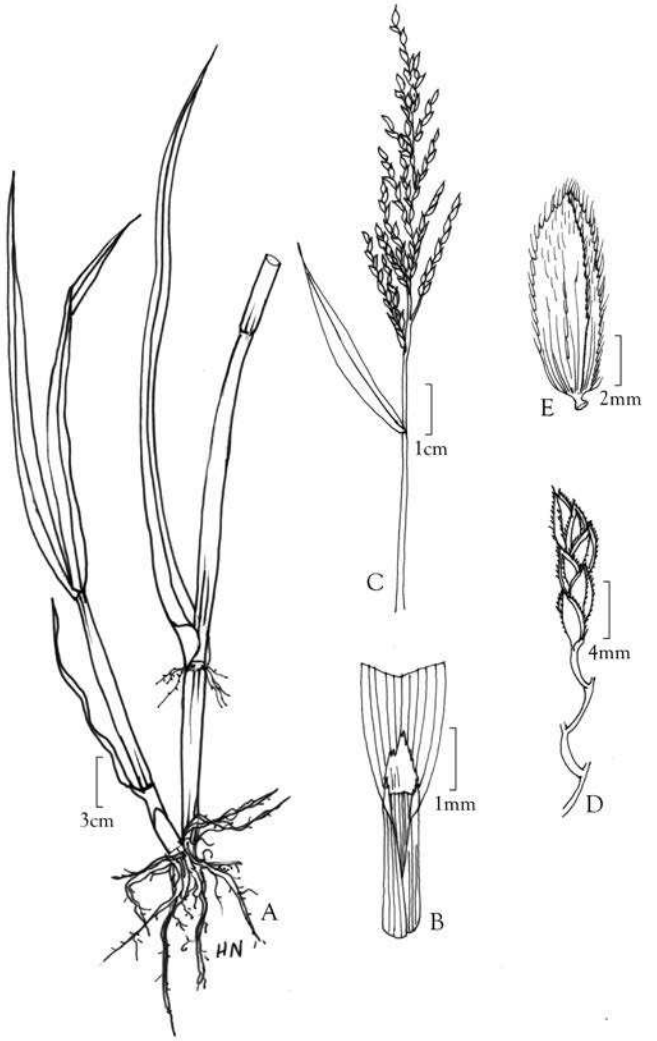


FIGURE 165. *Leersia hexandra.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Segment of Inflorescence. E. Spikelet. A drawn from *Täckholm s.n.* (CAI); B, E drawn from *J. Newbould & R. M. Harley 4434* (US-2473157); C, D modified from Ibrahim and Kabuye (1988).

long, 1–3(–8) mm wide, linear, flat, spreading, flaccid, scabrous, margins scabrous, apex acute. Panicles 5–12 cm long, 1–4 cm wide, open, elliptic or oblong; primary branches bearing spikelets almost to the base. Spikelets (3.2–)3.4–4.8(–5.2) mm long, (1–)1.2–1.4(–1.7) mm wide, oblong, laterally compressed, falling as a unit; lemmas awnless; anthers 6. Habitat: aquatic grass in water or marshland, weed of cultivation. Distribution: (Mm, Ms, Nv, Ol) throughout the tropics.

157. *Leptothrium senegalense* (Kunth) Clayton

FIGURE 166

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

Common names: *teiraab*; hook grass.

Caespitose, short-lived perennials. Culms up to 75 cm tall, wiry, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than the blade, flattened, ribbed, glabrous, margins membranous; ligule a fringe of hairs; blades 2–10 cm long, 1–2 mm wide, linear, involute, spreading, straight, scabrous, margins smooth, apex attenuate. Racemes numerous, borne along a central axis, in multilateral false spikes, spreading, cuneate, bearing few fertile spikelets. Spikelets 2.5–8 mm long, linear to lanceolate, laterally compressed, in pairs, gibbous; lemmas awnless. Habitat: sandy soils in desert grasslands. Distribution: (Ra, Ge) tropical Africa and SW Asia.

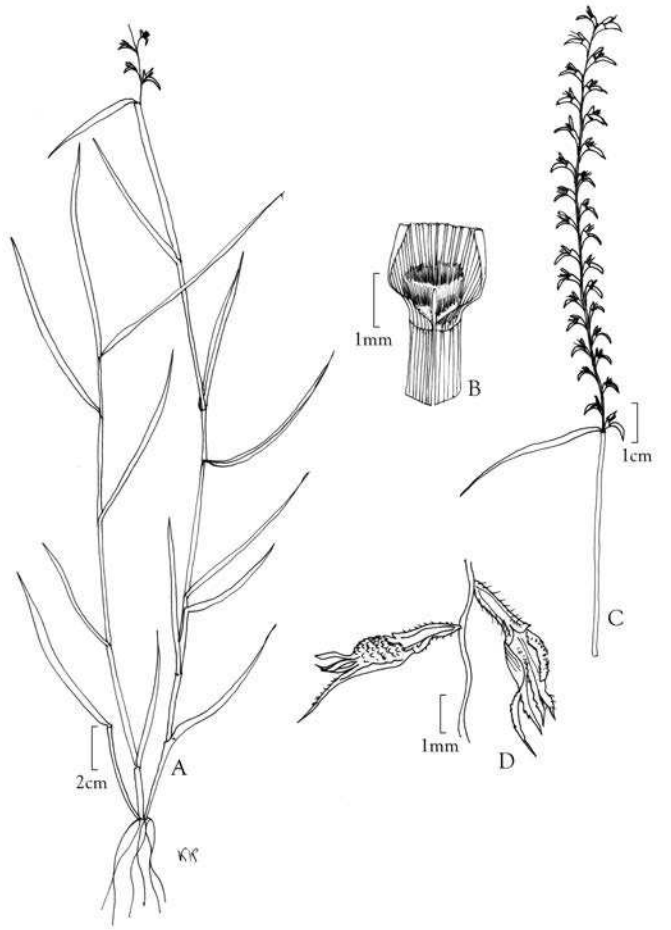


FIGURE 166. *Leptothrium senegalense.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Two spikelets. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from *Olufsen 206* (US-1718603).

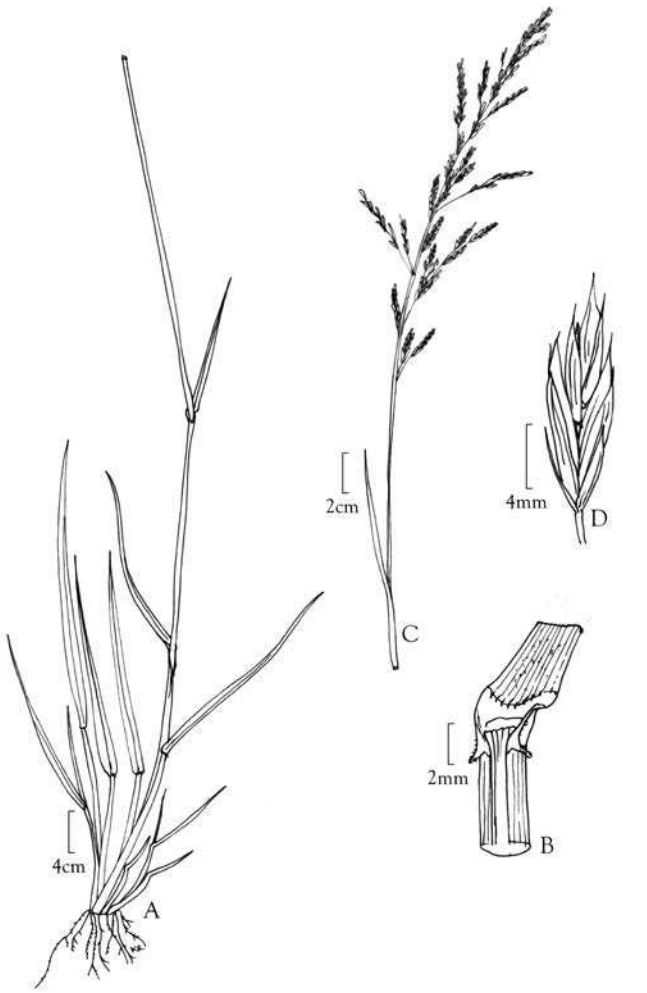


FIGURE 167. *Lolium arundinaceum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *R. Kanal s.n.* (US-3117694); D modified from Darbyshire (2007).

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

FIGURE 167

*Lolium arundinaceum** (Schreb.) Darbysh., Novon 3(3): 241. 1993. [*Festuca arundinacea* Schreb., Spic. Fl. Lips. 57. 1771.]
Common name: tall fescue.

Caespitose perennials. Culms 50–150 cm tall, erect, geniculate; internodes glabrous, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; collars dark colored, ciliate; auricles clawlike; ligules 1–2 mm long, membranous, apex truncate; blades 8–60 cm long, 4–10 mm wide, glabrous, linear, flat, ascending, straight, margins smooth, apex attenuate. Panicles 10–50 cm long, open, lanceolate or ovate, dense or loose; primary branches bearing 3–8 fertile spikelets, angular, scabrous. Spikelets 10–18 mm long, 3–10-flowered, elliptic or oblong, laterally compressed; glumes 3–7 mm long, 2; lemmas 6–9 mm long, awnless or awned, the awn up to 4 mm long. Habitat: introduced, weed of cultivation. Distribution: (Mm) temperate Eurasia.

159. *Lolium multiflorum** Lam.

FIGURE 168

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

Caespitose annuals or short-lived perennials. Culms 30–90 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; auricles clawlike; ligules 1–2 mm long, membranous, apex erose; blades 6–20 cm long, 4–8 mm wide, linear, flat, spreading, straight, scabrous, apex acuminate. Racemes 10–30 cm long, 2-sided, straight or slightly curved, stiff.

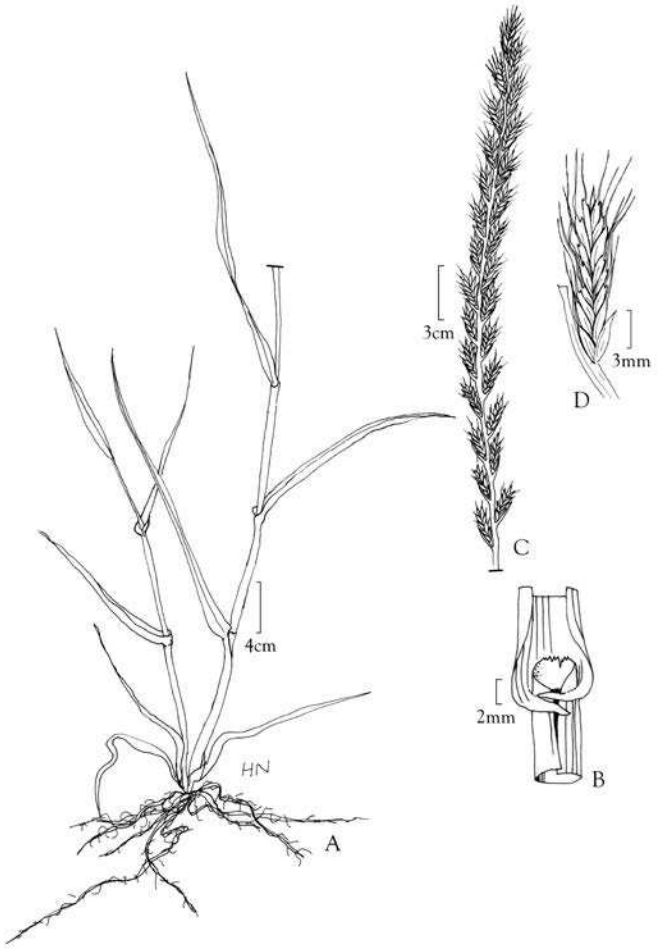


FIGURE 168. *Lolium multiflorum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *R. Kanal 260* (US-3214594); D modified from Hitchcock (1951).

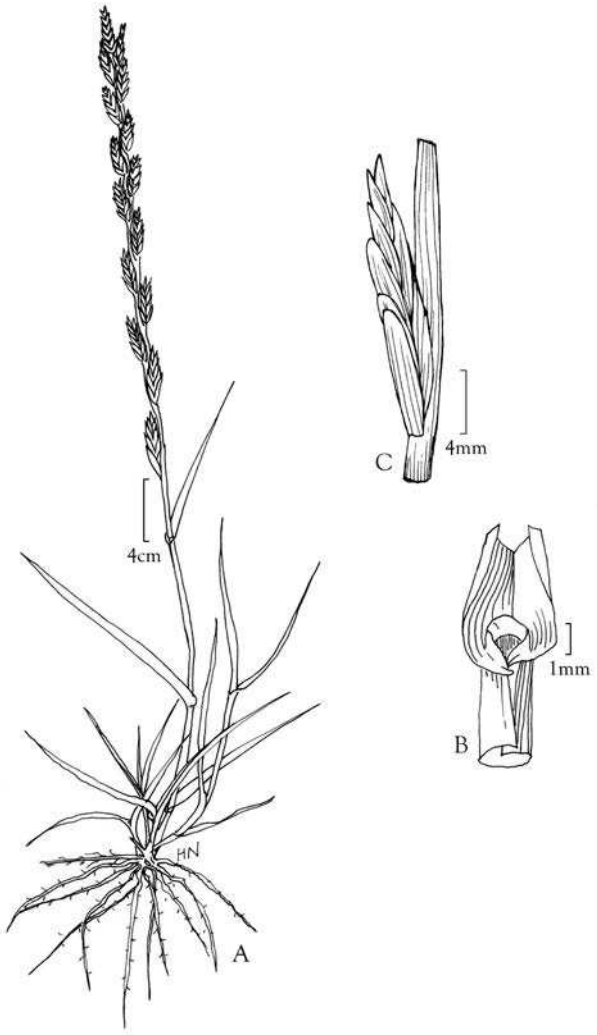


FIGURE 169. *Lolium perenne.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *L. B. Smith 5091* (US-2151147); C modified from Terrell (2007).

Spikelets 7.5–25 mm long, 11–22-flowered, oblong, laterally compressed,with a single glume; glumes 5–18 mm long; lemmas 4–8.2 mm long, awns 5–10 mm long, straight, scabrous. Habitat: introduced, a weed of lawns. Distribution: (Mm, Ms, Nv, Di, Ol, Ra) C and S Europe, NW Africa, and SW Asia.

160. *Lolium perenne** L.

FIGURE 169

*Lolium perenne** L., Sp. Pl. 1: 83. 1753.
Common names: *gazoon, hasheesh el faras, nuseil*; perennial rye grass.

Caespitose perennials. Culms 30–60 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; collar dark; auricles claw-like; ligules 1–2.5 mm long, membranous, apex truncate; blades 3–20 cm long, 2–4 mm wide, linear; flat, spreading, straight, scabrous, apex acute. Racemes 4–30 cm long, 2-sided, straight or slightly curved, stiff. Spikelets 7–20 mm long, 3–10(–14)-flowered, oblong, laterally compressed, appressed, with a single glume; glumes 3–15 mm long; lemmas 3.5–9 mm long, awnless. Habitat: introduced, a weed of lawns. Distribution: (Mm, Ms, Nv, Dg, Di, Ol, On, S) N Africa and temperate Asia.

161. *Lolium rigidum* Gaudin

FIGURE 170

Lolium rigidum Gaudin, Agrost. Helv. 1: 334. 1811.
Common names: *sammah*; annual rye grass, Swiss rye grass.

Caespitose annuals. Culms 20–80 cm tall, erect, geniculate; internodes glabrous, glossy; butt sheaths glabrous. Leaves basal and cauline; sheaths, ribbed, glabrous, margins membranous;

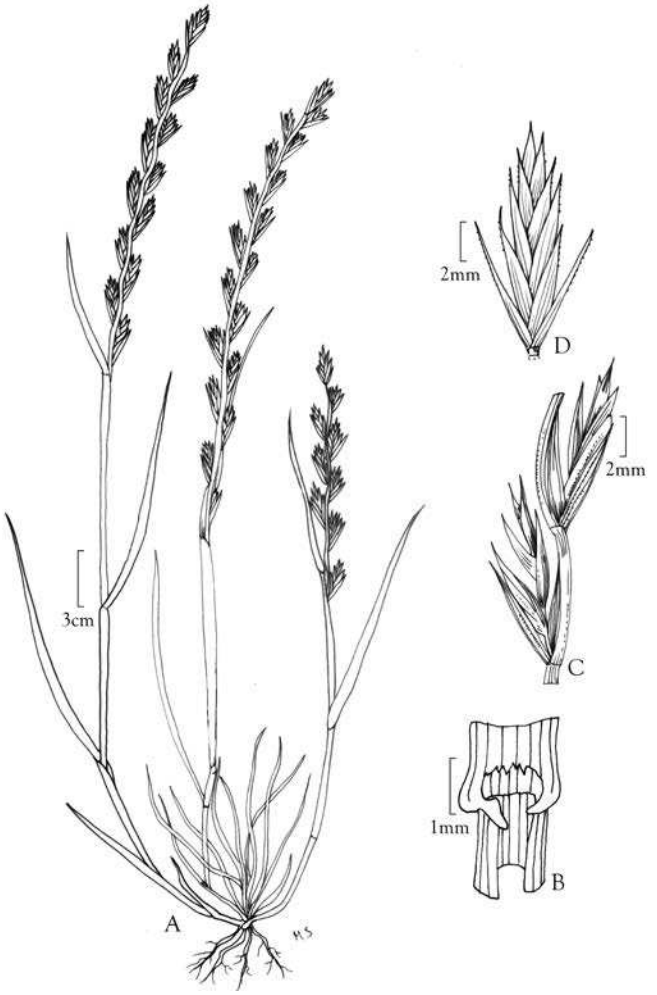


FIGURE 170. *Lolium rigidum.* A. Habit. B. Ligule, sheath, and blade. C. Segment of the inflorescence. D. Spikelet. A drawn from *M. Abd El-Ghani 2510* (CAI); B–D drawn from *G. Davidse 33455* (US-3596278).

auricles clawlike or absent; ligules 1–2 mm long, membranous, apex dentate; blades 4–20 cm long, 0.5–2 mm wide, linear, flat or conduplicate, spreading, straight, scabrous or smooth, apex acuminate. Racemes 3–30 cm long, 2-sided, straight or arcuate, bearing 2–19 fertile sunken spikelets. Spikelets 5–18 mm long, 1–3 mm wide, 5–11-flowered, oblong, laterally compressed, with a single glume; glumes 4–20(–30) mm long; lemmas 3.2–10 mm long, awnless or awned, the awn up to 3 mm long, straight. Habitat: introduced, weed of cultivation. Distribution: (Mm, Ms, Nv, Di, Ol, S) S Europe, Mediterranean region to C Asia.

162. *Lolium temulentum** L.

FIGURE 171

*Lolium temulentum** L., Sp. Pl. 1: 83. 1753.
Common names: *zawaan, zo-aan*; darnel ryegrass.

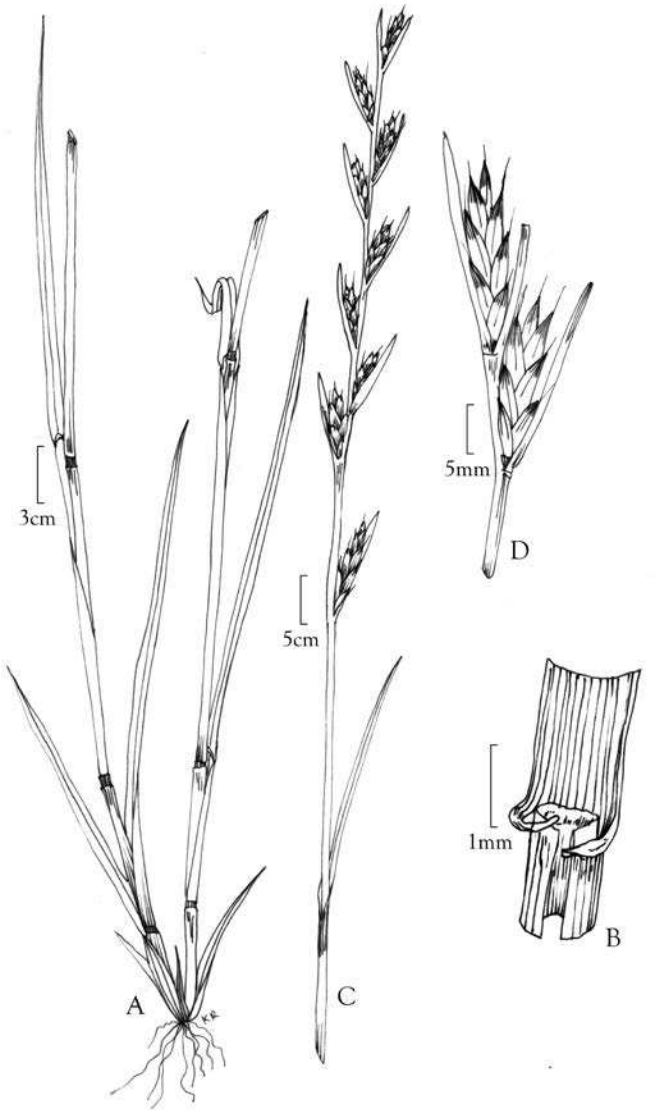


FIGURE 171. *Lolium temulentum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Two spikelets. A, C drawn from *M. Imam & J. Kosinova s.n.* (CAI); B, D drawn from *A. T. Semple 272* (US-2012605).

Caespitose annuals. Culms 20–100 cm tall, erect, geniculate, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; auricles clawlike; ligules 1–2 mm long, membranous, apex acute; blades 6–35 cm long, 2–10 mm wide, scabrous, apex attenuate. Racemes 10–30 cm long, 2-sided, erect, rigid. Spikelets 12–26 mm long, and 4–6 mm wide, 4–10-flowered, oblong, laterally compressed, breaking up at maturity, with a single glume; glumes 7–30 mm long; lemmas 4.5–8.5 mm long principal lemmas unawned or awned, the awns up to 20 mm long, straight. Habitat: introduced weed. Distribution: (Mm, Ms, Nv, Nn, Di, Ol,) Mediterranean, SW Asia, introduced in Europe.

163. *Lygeum spartum* L.

FIGURE 172

Lygeum spartum L., Gen. Pl., ed. 5: 522. 1754.
Common names: *halfa*; false esparto grass.

Caespitose perennials; rhizomes short and scaly. Culms 30–90 cm tall, erect, wiry, covered at the base by brown glossy coriaceous scales; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 6–8 mm long, membranous, apex acute; blades 5–20 cm long, 1–2 mm wide, filiform, revolute, ascending, appressed, straight, scabrous, apex attenuate. Panicles 3–5 cm long, 1-sided, included in the sheath, spatheole lanceolate. Spikelets 30–45 mm long, ovate, laterally compressed; lemmas 20–30 mm long, villous, the hairs 10–15 mm long, awnless. Habitat: rocky slopes and sandy soils often derived from calcareous substrates. Distribution: (Mm, Ms) Mediterranean region.

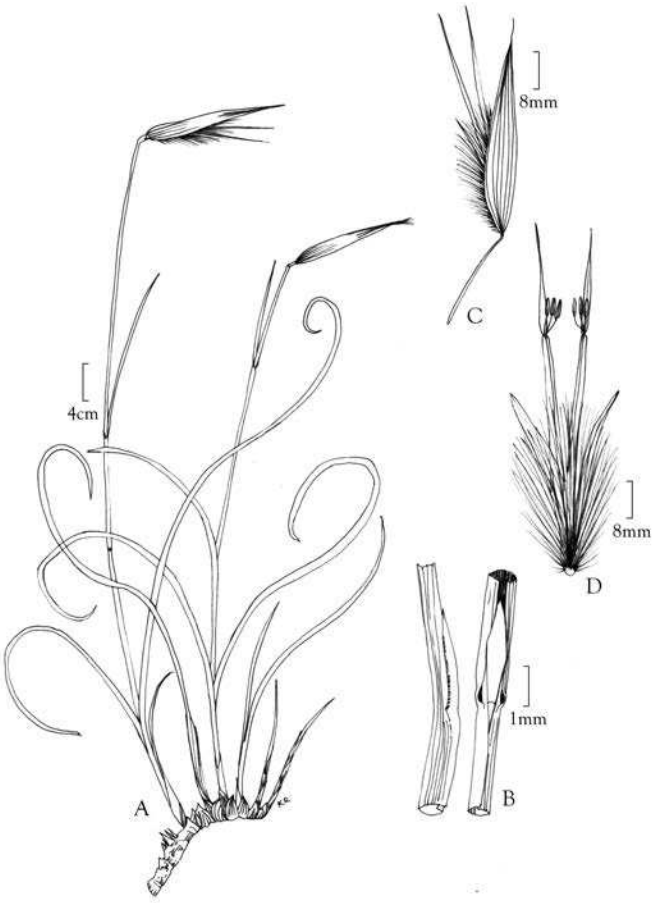


FIGURE 172. *Lygeum spartum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence composed of a single spikelet. D. Two lemmas. A drawn from *T. Cope, G. Fahmy, I. El Garf 242* (CAI), *V. Täckholm s.n.* (CAI); B–D drawn from *Fairchild 199* (US-1258695).

164. *Megathyrsus maximus* (Jacq.) B. K. Simon & S. W. L. Jacobs

FIGURE 173

Megathyrsus maximus (Jacq.) B. K. Simon & S. W. L. Jacobs, Austrobaileya 6(3): 572. 2003. [*Panicum maximum* Jacq., Icon. Pl. Rar. 1: 2, pl. 13. 1781.]
Common names: *hashish el genieh*; guinea grass.

Loosely or densely caespitose perennials; rhizomes short. Culms up to 200 cm tall, erect, geniculate, robust; internodes glabrous; often lower nodes rooting; butt sheaths pubescent. Leaves basal and cauline; sheaths scabrous, margins scabrous; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 10–40 cm long, 4–30 mm wide, linear, flat, spreading, flaccid, glabrous, scabrous or pilose, margins smooth, apex acuminate.

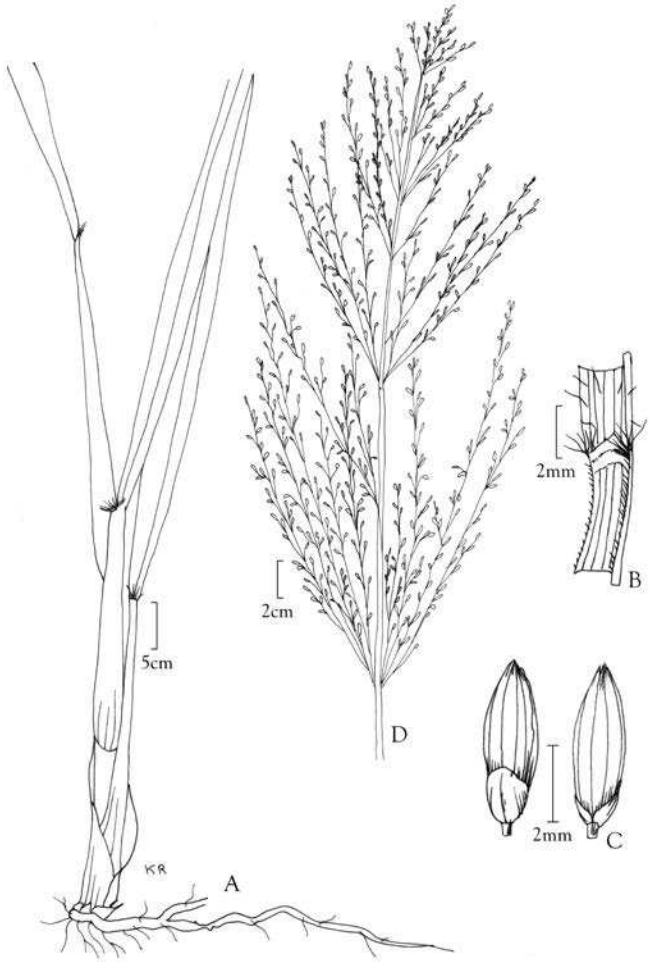


FIGURE 173. *Megathyrsus maximus*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A, C modified from Ibrahim and Kabuye (1988); B drawn from *L. J. Brass 18023* (US-2044653); D modified from Hitchcock (1951).

Panicles 12–45(–60) cm long, open, oblong or pyramidal. Spikelets (2.5–)3–4.5(–5) mm long, oblong, dorsally compressed, falling entire, apex obtuse or acute; lemmas awnless. Habitat: canal banks, waste places, and cultivated. Distribution: (Nv) tropical and S Africa.

165. *Melanocenchris abyssinica* (R. Br. ex Fresen.) Hochst.

FIGURE 174

Melanocenchris abyssinica (R. Br. ex Fresen.) Hochst., Flora 38: 274. 1855.
Common name: *teiraab*.

Caespitose annuals. Culms 10–20 cm tall, erect, geniculate, glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths hairy, margins membranous; oral hairs present; ligule a fringe of hairs; blades 1–5 cm long, 0.5–1 mm wide, filiform, flat or conduplicate, ascending, straight, scaberulous, margins tuberculate-ciliate, apex acuminate. Racemes 1–1.5 cm long, 3–5(–6) borne along a central axis, distant, spreading, cuneate, unilateral, bearing few fertile spikelets. Spikelets 7–9 mm long, appressed, cuneate, dorsally compressed; glumes 3 mm long, 1-awned; lemmas chartaceous, 3-awned, the central awn up to 3 mm long, straight, bristlelike. Habitat: sandy plains and wadi beds. Distribution: (Ge) NE Africa through Arabia to NW India.

166. *Melica persica* Kunth

FIGURE 175

Melica persica Kunth, Révis. Gramin. 1: 122, 351, t. 89. 1830.

Caespitose perennials; rhizomes elongated. Culms 15–50 cm tall, erect, geniculate, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths tubular for much of their length, ribbed, glabrous or densely retrorse-pubescent, margins smooth; ligules 1–3 mm long, membranous, apex acute, lacerate; blades 5–10 cm long, 1–2 mm wide, linear, flat, spreading, flaccid, glabrous or densely retrorse-pubescent, margins scabrous, apex acute. Panicles 3.5–12 cm long, spiciform, linear, equilateral or secund. Spikelets 5.5–10 mm long, cuneate, laterally compressed; lower fertile lemmas 4–7.5 mm long, 7–9-veined, pilose with tubercle-based hairs, awnless. Habitat: rocky slopes. Distribution: (S) E Mediterranean region, SW Asia to Pakistan.

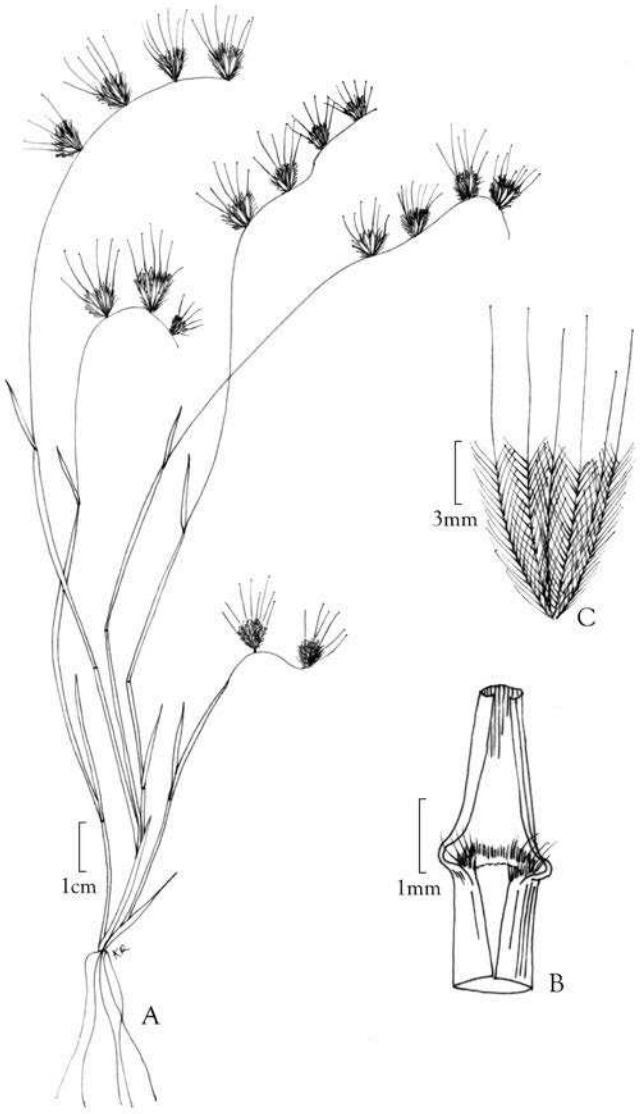


FIGURE 174. *Melanocenchris abyssinica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalabi, M. Zahran s.n.* (CAI); B, C drawn from *A. Pappi s.n.* (US-1984367).

KEY TO THE SUBSPECIES

1a. Leaf sheaths and blades glabrous . . . . . ***M. persica* subsp. *inaequiglumis* (Boiss.) Bor, Fl. Iranica 70/30(1): 255. 1970**
1b. Leaf sheaths and blades densely retrorse-pubescent . . . . . .
. . . . . ***M. persica* subsp. *canescens* (Regel) P. H. Davis, Fl. Turkey & E. Aegean Isl. 9: 534. 1985**

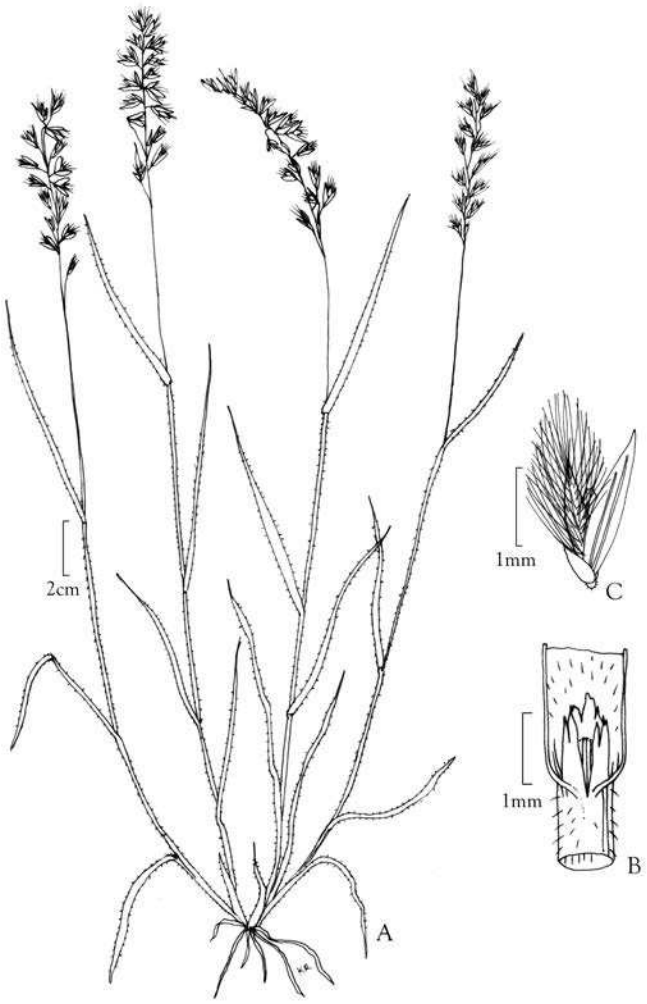


FIGURE 175. *Melica persica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, N. El Hadidi 243*; B drawn from *K. H. Rechinger 1142* (US-2042109); C modified from Cope (2005).

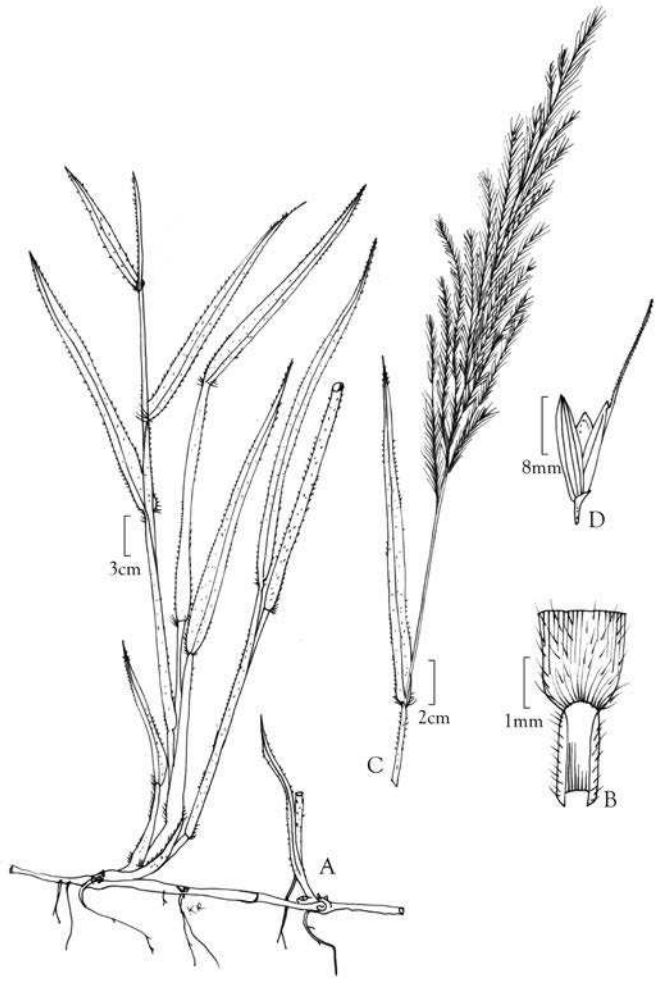


FIGURE 176. *Melinis minutiflora.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *S. L. Hatch 4195a* (US-3626783).

167. *Melinis minutiflora** P. Beauv.

FIGURE 176

*Melinis minutiflora** P. Beauv., Ess. Agrostogr. 54, pl. 11, f. 454. 1812.
Common name: molasses grass.

Caespitose perennials, often matted, aromatic. Culms up to 100 cm tall, erect, geniculate, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths tomentose, viscid, often smelling of linseed oil, margins scabrous; oral hairs present; ligule a fringe of hairs; blades 5–20 cm long, 2–8 mm wide, linear, flat, ascending, straight, pilose, margins scabrous, apex acute. Panicles 10–30 cm long, open, oblong; dense. Spikelets 1.5–2(–2.4) mm long, oblong, slightly laterally compressed, falling entire; lemmas awnless or awned, the awns up to 15 mm long. Habitat: cultivated areas, introduced. Distribution: (Nv) native of tropical Africa, widely grown as a fodder grass.

168. *Melinis repens** (Willd.) Zizka

FIGURE 177

*Melinis repens** (Willd.) Zizka, Biblioth. Bot. 138: 55. 1988.
Common name: natal grass.

Caespitose annuals or short-lived perennials. Culms up to 150 cm tall, erect, geniculate; internodes glabrous; lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths

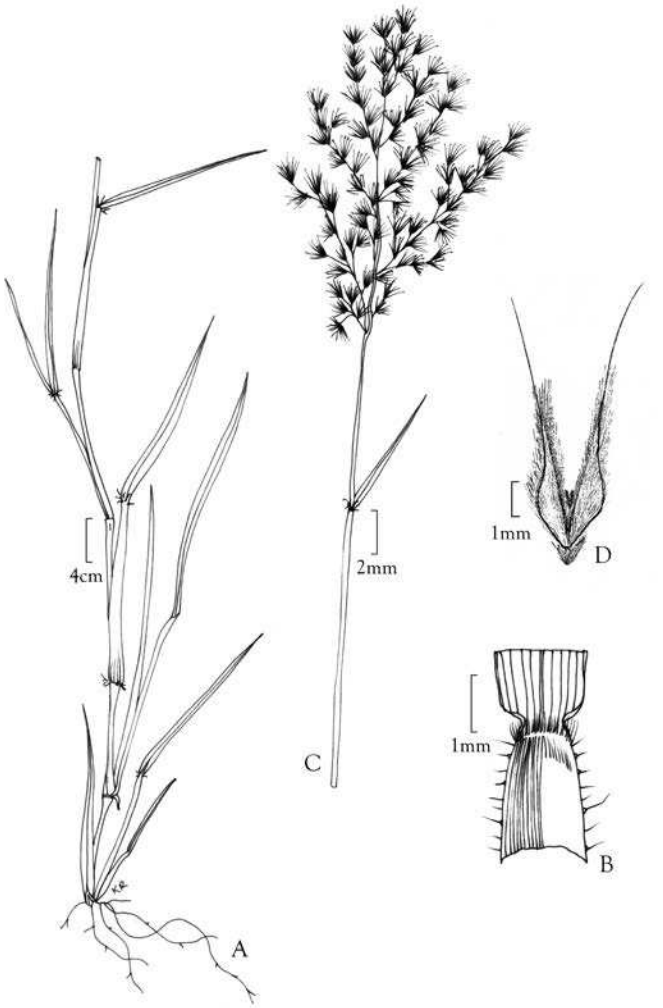


FIGURE 177. *Melinis repens.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *R. Halwagy 119* (CAI); B–D drawn from *M. M. Hochobes & D. Lutombi WIND91911.0* (US-3600188).

hairy, margins sparsely hairy; ligule a fringe of hairs; blades 5–25 cm long, 1–4 mm wide, linear, conduplicate, spreading, straight, glabrous, margins scabrous, apex attenuate. Panicles 5–20 cm long, open, oblong or ovate; branches capillary. Spikelets 5–12 mm long, ovate, laterally compressed; glumes mucronate or awned, the awns 1–7 mm long; lemmas unawned or with awns up to 7 mm long, straight. Habitat: cultivated areas and roadsides. Distribution: (Nv) Africa.

KEY TO THE SUBSPECIES

1a. Spikelets 2–5 mm long; internodes between the glumes 0.1–0.7 mm long . . . . . ***M. repens* subsp. *repens***
1b. Spikelets 5–12 mm long; internodes between the glumes usually 0.7–1.7 mm long . . . . . ***M. repens* subsp. *grandiflora* (Hochst.) Zizka, Biblioth. Bot. 138: 60. 1988**

169. *Miscanthus sinensis** Andersson

FIGURE 178

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

Caespitose perennials; rhizomes short. Culms up to 300 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins smooth; oral hairs present; ligules 1–2 mm long, ciliate membranes; blades 50–100 cm long, 10–20 mm wide, linear, flat, spreading, straight, scabrous, apex acute. Inflorescences 10–40 cm long, with 4–40 digitately arranged branches, the branches up to 20 cm long, drooping or ascending. Spikelets 4.5–7 mm long, in pairs, lanceolate, dorsally compressed; callus hairs 5–7 mm long, silvery; upper lemma awns 6–12 mm long, geniculate, column twisted. Habitat: cultivated, ornamental. Distribution: (N) native of E and SE Asia.



FIGURE 178. *Miscanthus sinensis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. Kanal 093* (US-3075146); C modified from Hitchcock (1951).

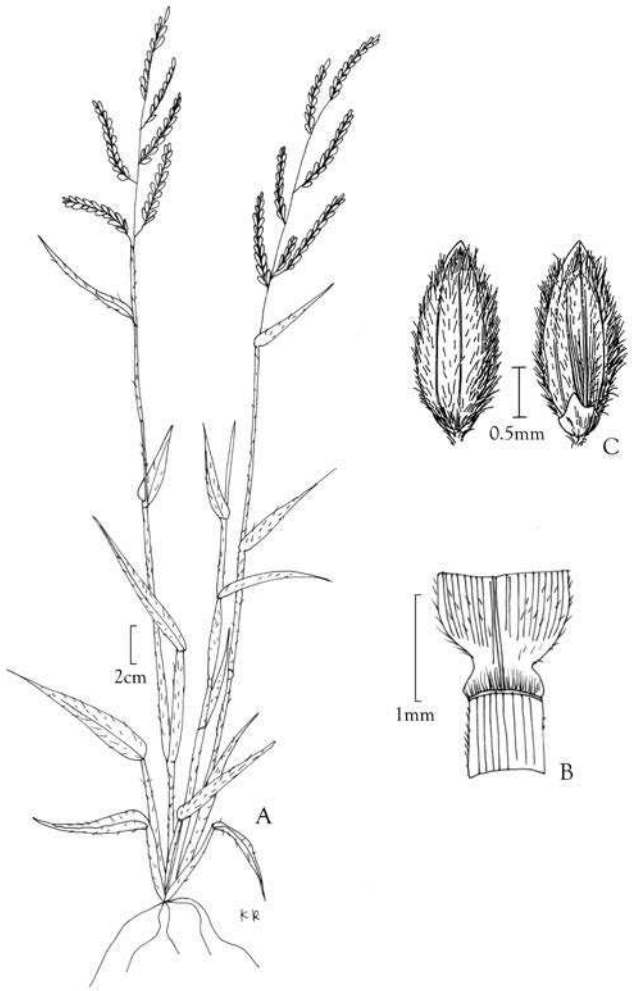


FIGURE 179. *Moorochloa eruciformis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower (right) and upper (left) glumes. A modified from Ibrahim and Kabuye (1988); B drawn from *P. J. Greenway 9783* (US-2433025); C modified from Wipff and Thompson (2003b).

170. *Moorochloa eruciformis* (Sm.) Veldkamp

FIGURE 179

Moorochloa eruciformis (Sm.) Veldkamp, Reinwardtia 12(2): 139. 2004. [*Brachiaria eruciformis* (Sm.) Griseb.; *Panicum eruciforme* Sm.]

Common name: sweet signalgrass.

Caespitose annuals. Culms 15–60 cm tall, decumbent; nodes bearded; internodes glossy, semiterete; butt sheaths glabrous. Leaves mostly cauline; sheaths longer than the blades, hairy, margins hairy; ligules 1 mm long, a fringe of hairs; blades 2–20 cm long, 5–20 mm wide, linear to narrowly lanceolate, flat, spreading, sparsely hairy, margins ciliate, apex acute. Racemes 0.5–2.5 cm long, 3–14 borne along a central axis, unilateral; central inflorescence axis 1–8 cm long, rachis wingless, angular. Spikelets 1.7–2.7 mm long, elliptic, dorsally compressed; lemmas awnless. Habitat: damp grasslands and a weed in cultivated areas. Distribution: (Nv, Nn, Ol, On, S) Mediterranean region to S Africa and India.

171. *Oloptum miliaceum* (L.) Röser & H. R. Hamasha

FIGURE 180

Oloptum miliaceum (L.) Röser & H. R. Hamasha, Pl. Syst. Evol. 298: 365. 2012. [*Piptatherum miliaceum* (L.) Coss.; *Achnatherum miliaceum* (L.) P. Beauv.; *Oryzopsis miliacea* (L.) Asch. & Schweinf.; *Agrostis miliacea* L.]

Common names: *hemri, homaar*; smilo grass.

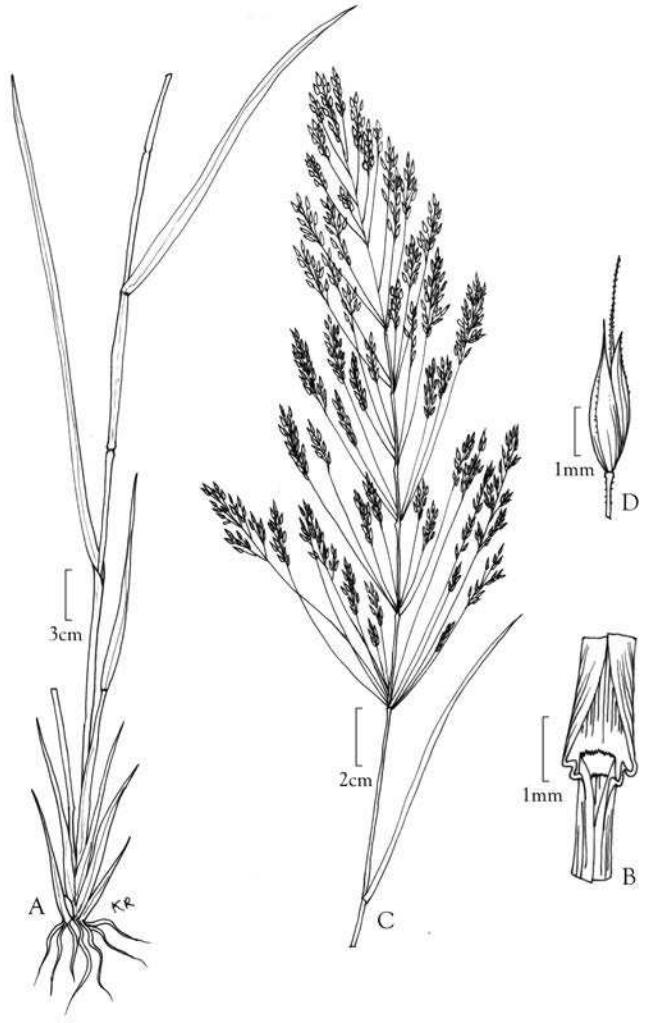


FIGURE 180. *Oloptum miliaceum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B, D drawn from *G. Schweinfurth 1717* (US-823173); C drawn from *A. Amer 8944* (CAI).

Caespitose perennials. Culms 60–100 cm tall, wiry, erect, glabrous; butt sheaths glabrous. Leaves basal and cauline, sheaths glabrous, margins smooth; collars ciliate; ligules 1–2 mm long, membranous, pubescent, apex erose; blades 10–30 cm long, 4–8 mm wide, linear, flat, spreading, straight, ribbed, scabrous, margins scabrous, apex acuminate. Panicles 20–40 cm long, open, ovate. Spikelets 3 mm long, elliptic, dorsally compressed; callus hairy; lemmas 1.5–2 mm long, glabrous, awns 3–5 mm long, straight, bristlelike. Habitat: aquatic and sandy habitats. Distribution: (Mm, Ms, Nv, Dg, Di, S) Mediterranean region and SW Asia.

172. *Oryza sativa** L.

FIGURE 181

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

Caespitose annuals. Culms up to 150 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, glabrous, margins smooth; auricles clawlike, erect; ligules up to 10 mm long, membranous, apex lacerate, acute; blades 10–50 cm long, 4–10 mm wide, linear, flat, spreading, straight, scaberulous, glabrous or pubescent, margins scabrous, apex acuminate. Panicles 20–50 cm long, lanceolate, equilateral or nodding. Spikelets 8–11 mm long,

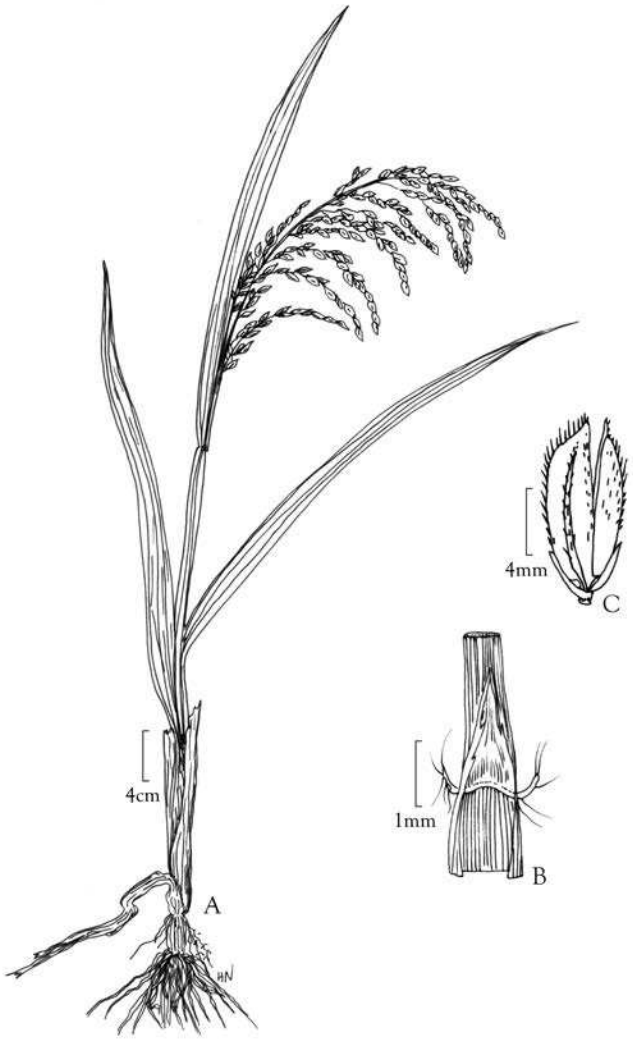


FIGURE 181. *Oryza sativa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *El Hadidi s.n.* (CAI), Ibrahim and Kabuye (1988); B, C drawn from *P. Taylor 9367* (US-2461385).

2.5–3.5 mm wide, elliptic or oblong, laterally compressed; lemmas unawned or awned, the awns up to 16 mm long; anthers 6. Habitat: cultivated. Distribution: (Mm, Ms, Nv, Ol) warm temperate regions.

173. *Panicum antidotale* Retz.

FIGURE 182

Panicum antidotale Retz., Observ. Bot. 4: 17. 1786.
Common names: blue panic grass, giant blue panic grass.

Caespitose perennials; rhizomes short; rootstock woody. Culms up to 180 cm tall, erect; nodes swollen; lower internodes hirsute; butt sheaths pubescent. Leaves basal and cauline; sheaths glabrous, margins membranous; collars dark; ligules 0.5–1 mm long, a fringe of hairs; blades 6–25 cm long, 2–10 mm wide, linear, flat, ascending, straight, scabrous, apex attenuate. Panicles 13–32 cm long, oblong to ovate or pyramidal, open to contracted near the primary branches. Spikelets 2.4–3.2 mm long, elliptic, dorsally compressed, apex acute; lemmas awnless. Habitat: dry grasslands derived from calcareous parent materials and roadsides. Distribution: (Mm, Nv, Ra) tropical Africa to India.

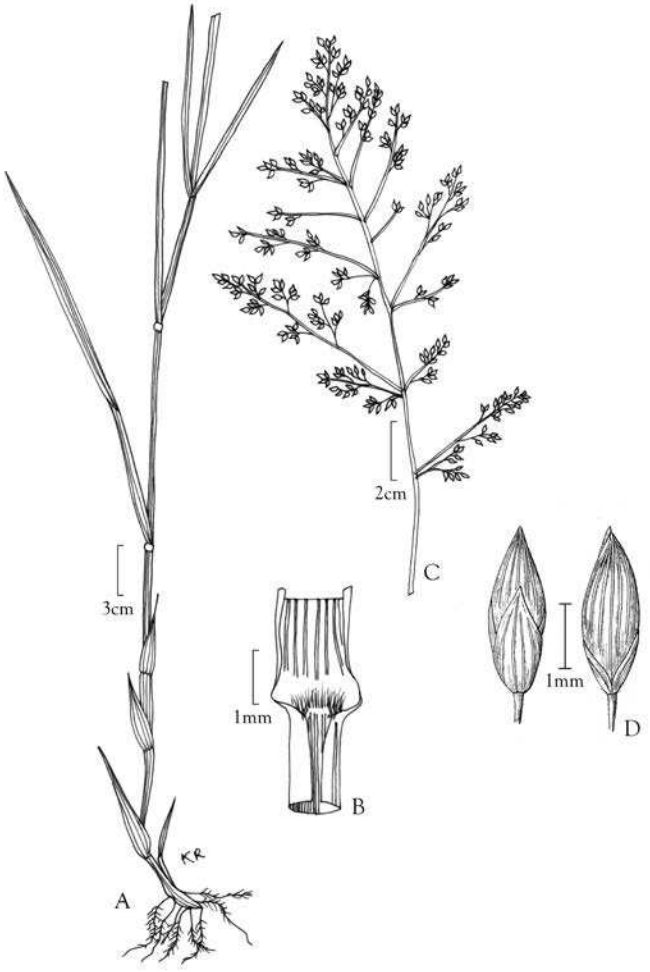


FIGURE 182. *Panicum antidotale*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with lower (left) and upper (right) glumes. A drawn from *M. Kassas s.n.* (CAI); B, C drawn from *F. Starr 020201-1* (US-3437456): D modified from Freckman and Lelong (2003).

174. *Panicum coloratum* L.

FIGURE 183

Panicum coloratum L., Mant. Pl. 1: 30. 1767.
Common names: *shawash*; colored guinea grass.

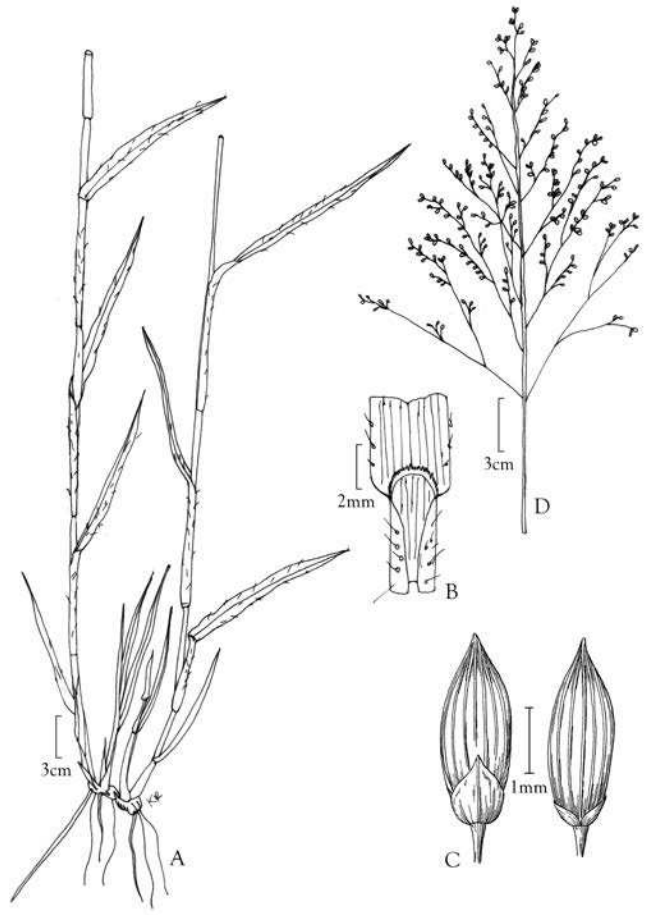


FIGURE 183. *Panicum coloratum*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower (left) and upper (right) glumes. D. Inflorescence. A drawn from *N. El Hadidi s.n.* (CAI); B, D drawn from *W. L. Watt 16* (US-1389381); C modified from Freckman and Lelong (2003).

Caespitose perennials. Culms up to 100 cm tall, erect, often with swollen bases; internodes glabrous; butt sheaths persistent, glabrous. Leaves basal and cauline; sheaths ribbed, sparsely hairy, margins hairy; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 10–30 cm long, 4–10 mm wide, linear, flat, spreading, flaccid, glabrous or pilose, margins cartilaginous, bases broadly rounded or cordate, apex acute. Panicles 4–30(–40) cm long, open, oblong. Spikelets 2–3 mm long, ovate, dorsally compressed, apex obtuse, acute or acuminate; lemmas awnless. Habitat: canal banks, stream banks, and gardens. Distribution: (Mm, Ms, Nv, Di, Ol) tropical Africa and Arabia.

175. *Panicum hygrocharis* Steud.

FIGURE 184

Panicum hygrocharis Steud., Syn. Pl. Glumac. 1: 72. 1854.

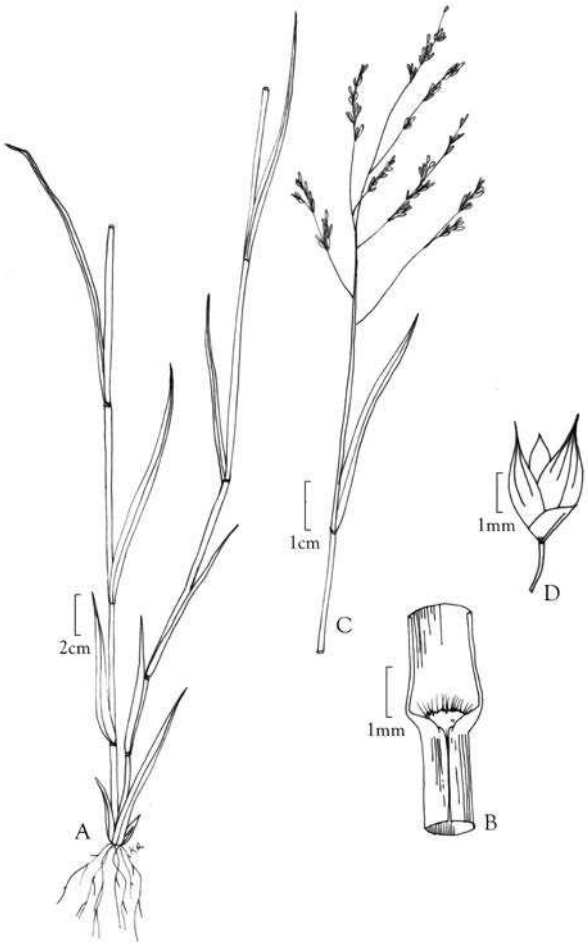


FIGURE 184. *Panicum hygrocharis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *R. Halwagy 114* (CAI); B, C drawn from *J. Ash s.n.* (US-2837115); D modified from Ibrahim and Kabuye (1988).

Caespitose perennials; stolons sometimes present; rhizomes elongated. Culms up to 100 cm tall, erect, geniculate; internodes glabrous, spongy, ribbed; nodes bearded and sometimes rooting at lower nodes; butt sheaths persistent, glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins smooth; ligules 1–2 mm long, ciliate membranes; blades 5–10 cm long, 2–5 mm wide, linear, flat, distichous, spreading, flaccid, hairy on basal ⅓, margins crinkled, apex attenuate. Panicles 6–14 cm long, open, oblong or ovate. Spikelets 2.5–3 mm long, ovate, dorsally compressed, apex acuminate; lemmas awnless. Habitat: canal banks and gardens. Distribution: (Mm) tropical E and S Africa.

176. *Panicum miliaceum** L.

FIGURE 185

*Panicum miliaceum** L., Sp. Pl. 1: 58. 1753.
Common names: *dokhn*; broomcorn millet, proso millet.

Caespitose annuals. Culms up to 100 cm tall, erect; robust; internodes hirsute; nodes bearded; butt sheaths persistent,



FIGURE 185. *Panicum miliaceum*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (left) and lower (right) glumes. A–C drawn from *E. S. Steele s.n.* (US-494805); D modified from Hitchcock (1951).

glabrous. Leaves basal and cauline; sheaths, ribbed, hairy, margins hairy; oral hairs present; ligules 1–2 mm long, ciliate membrane; blades 10–20 cm long, 5–15 mm wide, linear-lanceolate, flat, spreading, flaccid, glabrous or sparsely hairy, margins wavy, pubescent, apex acute. Panicles 5–10(–20) cm long, contracted, obovate, nodding. Spikelets 4.5–5 mm long, elliptic or ovate, dorsally compressed; lemmas awnless. Habitat: cultivated and a weed. Distribution: (Mm, Nv) India and warm temperate regions.

177. *Panicum repens* L.

FIGURE 186

Panicum repens L., Sp. Pl., ed. 2, 1: 87. 1762.
Common names: *negil dakar, neseela na'am, nigeel farisi, qeseiba*; panic rampant, torpedo grass.

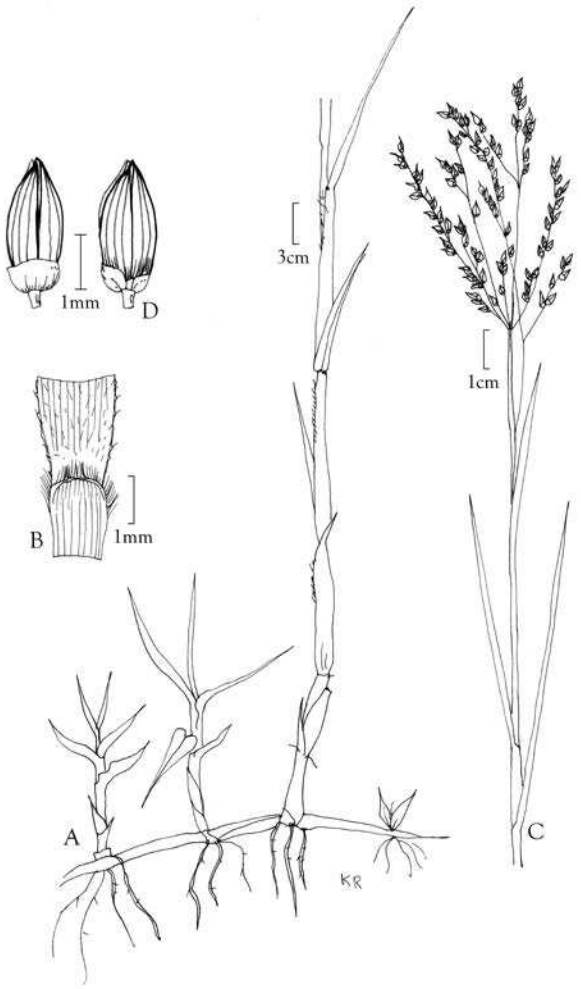


FIGURE 186. *Panicum repens.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A drawn from *J. Osborn & I. Helmy s.n.* (CAI); B, C drawn from *A. C. Thomas 861* (US-1538900); D modified from Freckman and Lelong (2003).

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

178. *Panicum turgidum* Forssk.

FIGURE 187

Panicum turgidum Forssk., Fl. Aegypt.-Arab.: 18. 1775.
Common name: *thammam, thommam*.

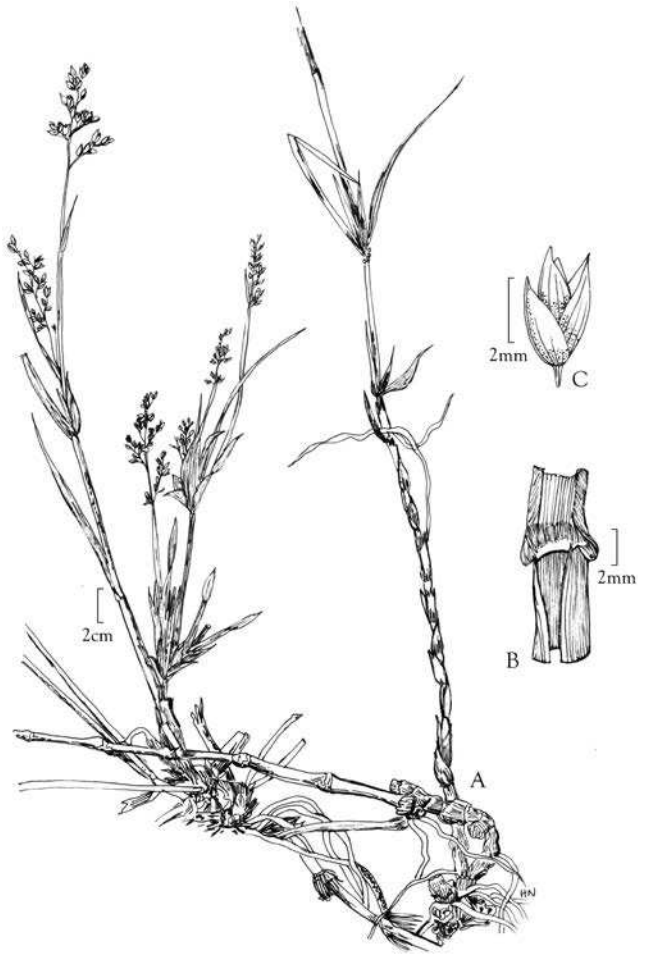


FIGURE 187. *Panicum turgidum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm 644* (CAI); B, C drawn from *G. Schweinfurth 84* (US-823864).

Caespitose perennial forming rounded bushes; rhizomes elongated. Culms up to 100 cm tall, solid, woody, erect, tough, ribbed; internodes glabrous; nodes dark; butt sheaths sparsely hairy. Leaves distichous, glaucous, basal and cauline; sheaths much longer than blades, overlapping, ribbed, glabrous, margins membranous; oral hairs present; ligule a ciliate membrane; blades 2–15 cm long, 1–6 mm wide, linear-lanceolate, convolute, spreading, stiff, coriaceous, glabrous, margins smooth, apex spiny, pungent. Panicles 2.5–15(–30) cm long, open, pyramidal, contracted. Spikelets (3.1–)3.4–4.5(–5) mm long, ovate, dorsally compressed, falling entire, apex acute or acuminate; lemmas awnless. Habitat: sandy soils. Distribution: (Mm, Ms, Nv, Nn, Dl, Dg, Da, Di, Ol, On, S, Ra, Ge) N and NE Africa and SW Asia.

179. *Parapholis filiformis* (Roth) C. E. Hubb.

FIGURE 188

Parapholis filiformis (Roth) C. E. Hubb., Blumea, Suppl. 3: 14. 1946.

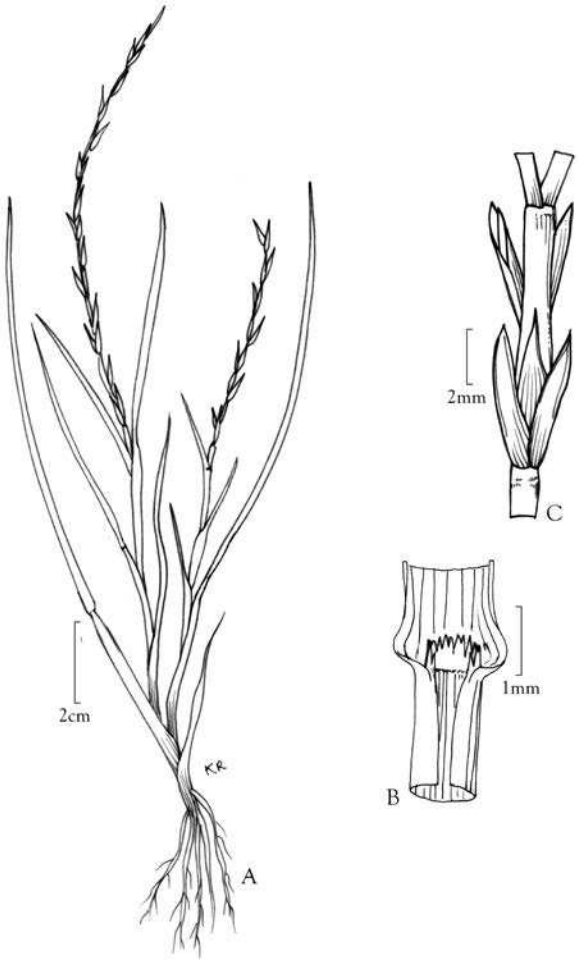


FIGURE 188. *Parapholis filiformis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *H. Leking 298* (CAI); B, C drawn from *G. C. Joad* (US-153537).

Caespitose annuals. Culms 5–20 cm tall, erect, geniculate, weak, wiry; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than adjacent internodes, flattened, glabrous, margins membranous; ligules 1–2 mm long, membranous, apex erose; blades 3–15 cm long, 1–2 mm wide, linear, convolute, appressed, straight, ribbed, scaberulous, margins smooth, apex acuminate. Racemes 5–10 cm long, solitary, bearing 10–20 fertile spikelets on each node, ragged or smooth, bilateral. Spikelets 4–6 mm long, embedded in rachis, oblong, laterally compressed; lemmas awnless; anthers 3.5–4 mm long. Habitat: sandy areas. Distribution: (Nn? or Nv?) Mediterranean.

180. *Parapholis incurva* (L.) C. E. Hubb.

FIGURE 189

Parapholis incurva (L.) C. E. Hubb., Blumea, Suppl. 3: 14. 1946. Common names: *imzein, timzein*; coast barbgrass, curly barbgrass, curved sea grass, sicklegrass.

Caespitose annuals. Culms 2–20 cm tall, erect or prostrate, geniculate, rigid; internodes glabrous; butt sheaths glabrous.

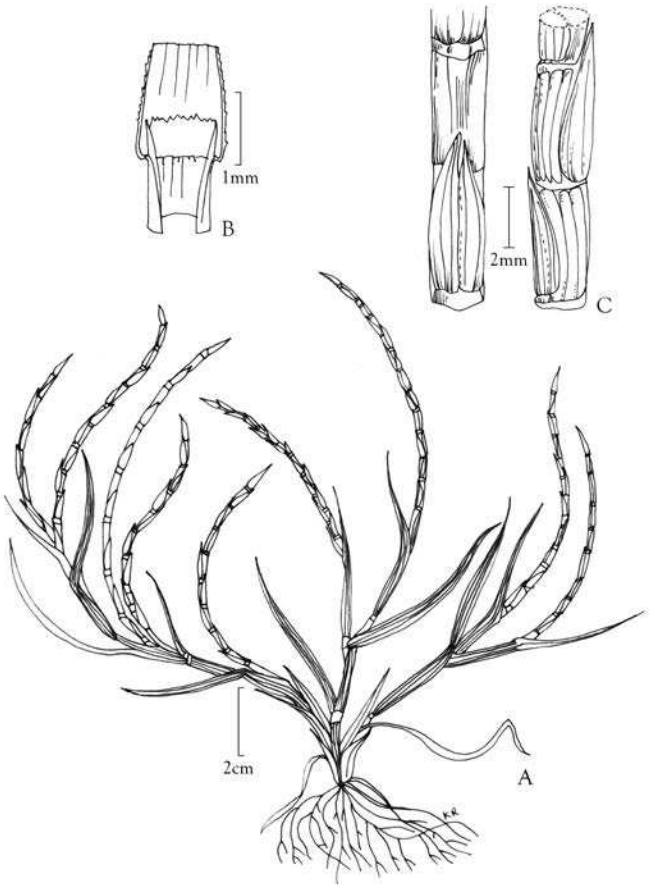


FIGURE 189. *Parapholis incurva.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets. A drawn from *I. Garf s.n.* (CAI); B, C drawn from *Calvas* (US-204931).

Leaves basal and cauline; sheaths flattened and inflated above, glabrous, margins smooth; ligules 0.5–1 mm long, membranous, apex erose; blades 1–3 cm long, 0.5–10 mm wide, linear, involute, spreading, straight, scabrous, margins smooth, apex acuminate. Racemes 1–8 cm long, single, 1-sided or curved, terminal, smooth, bilateral. Spikelets 4–6 mm long, embedded in rachis, spatheate, oblong, laterally compressed; lemmas awnless; anthers 0.5–0.9 mm long. Habitat: sand dunes usually near the coast. Distribution: (Mm, Ms, Nv, Di, Ol) W Europe, Mediterranean, and SW Asia.

181. *Parapholis marginata* Runemark

FIGURE 190

Parapholis marginata Runemark, Bot. Not. 115: 8, 14. 1962.

Caespitose annuals. Culms 5–15 cm tall, erect, geniculate, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; uppermost sheaths flattened and inflated, ribbed, glabrous, margins smooth; ligules 1–2 mm long, membranous, apex erose; blades 1–15 cm long, 1–2 mm wide, linear, convolute, spreading, straight, ribbed, scaberulous, margins smooth, apex attenuate-filiform. Racemes 3–15 cm long, 1–2 mm wide, solitary, bilateral, bearing 5–10 fertile spikelets. Spikelets 4–6 mm long, appressed, oblong, laterally compressed; lemmas awnless; anthers 0.5–0.8 mm long. Habitat: sandy and stony soils. Distribution: (Mm, Ms, Nv, Dg) E Mediterranean region.

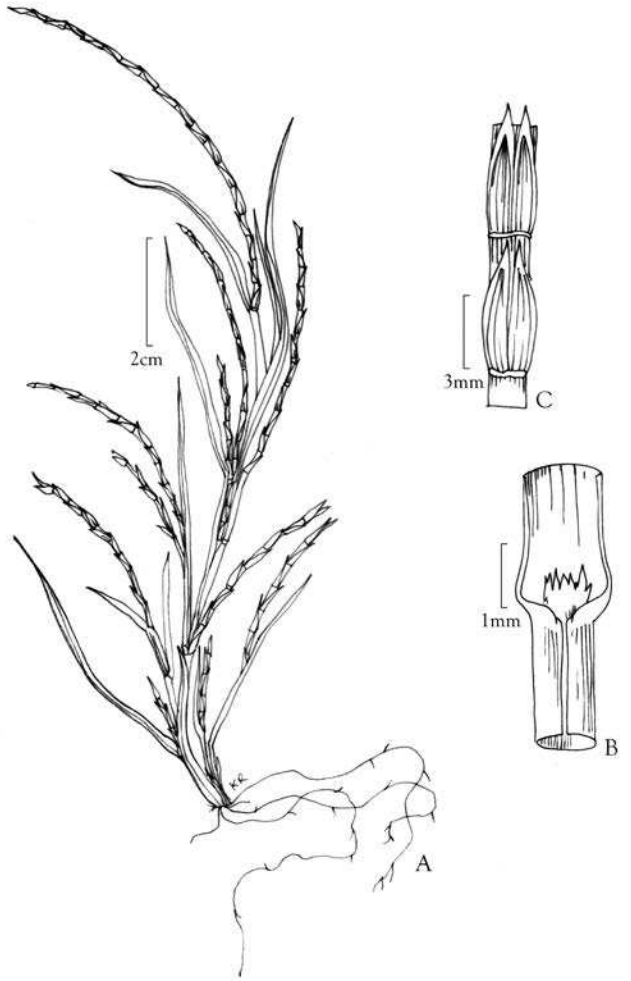


FIGURE 190. *Parapholis marginata*. A. Habit. B. Ligule, sheath, and blade. C. Two spikelets. A drawn from *M. Hilli s.n.* (CAI); B, C drawn from *K. H. Rechinger 14023* (US-1936765).

182. *Paspalum dilatatum** Poir.

FIGURE 191

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

Caespitose perennials. Culms 30–180 cm tall, robust, erect; internodes glabrous; occasionally lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths overlapping,



FIGURE 191. *Paspalum dilatatum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet with upper glume. A, B drawn from *E. F. Wells & R. L. Brown 4192* (US-3418174); C modified from Hitchcock (1951).

glabrous or sparsely hairy, margins smooth; oral hairs present; collars dark; ligules 3 mm long, membranous, apex truncate; blades 5–55 cm long, 3–10 mm wide, linear, flat, spreading, scabrous, margins scabrous, apex acuminate. Racemes 1.5–3 cm long, (2–)3–5(–11) digitately borne along a central axis, unilateral. Spikelets 2.7–3.8 mm long, ovate, dorsally compressed, plano-convex, apex acute; upper glumes with a ciliate margin; lemmas awnless. Habitat: introduced. Distribution: (Nv) native to S America.

183. *Paspalum distichum* L.

FIGURE 192

Paspalum distichum L., Syst. Nat., ed. 10, 2: 855. 1759.
Common names: *hasheesh abu khosa, moddeid*; knotgrass, water couch.

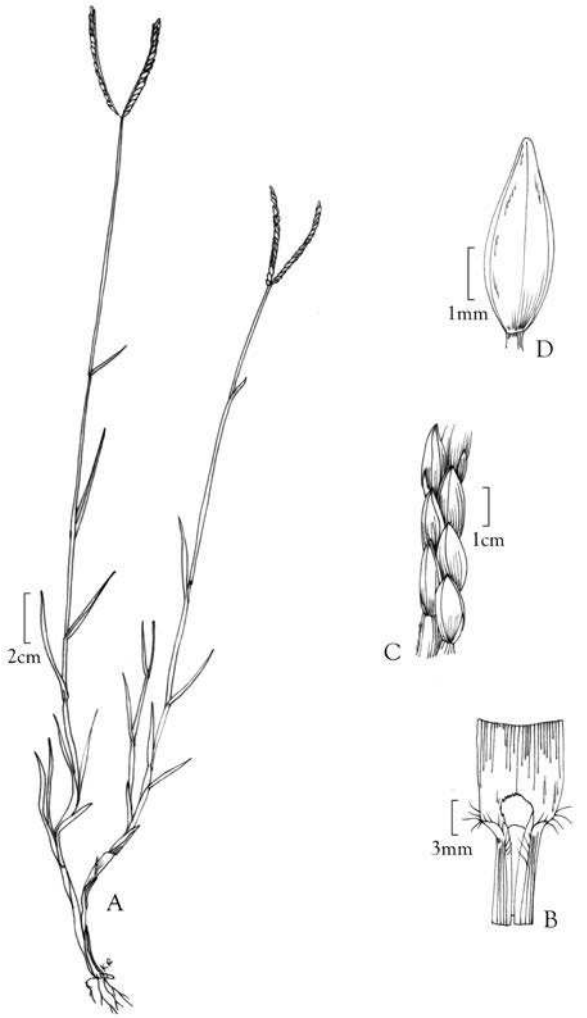


FIGURE 192. *Paspalum distichum.* A. Habit. B. Ligule, sheath, and blade. C. Segment of inflorescence. D. Spikelet. A–D drawn from *P. A. Schafer 8622* (US-3399261).

Mat-forming perennials; stolons present. Culms 5–50 cm tall, decumbent; internodes scabrous; sometimes lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; collars dark colored; auricles acute; ligules 1–2 mm long, membranous, apex erose; blades 3–10 cm long, 2–6 mm wide, linear, flat, spreading, reflexed, scabrous, ribbed, margins scabrous, apex acuminate. Racemes 2–8 cm long, 2(–4) digitately borne along central axis in 2 rows on a winged rachis, unilateral. Spikelets (2.5–)3–4 mm long, ovate, dorsally compressed, turgidly plano-convex, apex acute; upper glumes without ciliate margins; lemmas awnless. Habitat: aquatic and moist sites. Distribution: (Ms, Nv, Nn, Di, Ol, On) tropics and subtropics.

184. *Paspalum racemosum** Lam.

FIGURE 193

*Paspalum racemosum** Lam., Tabl. Encycl. 1: 176. 1791.
Common name: Peruvian paspalum.

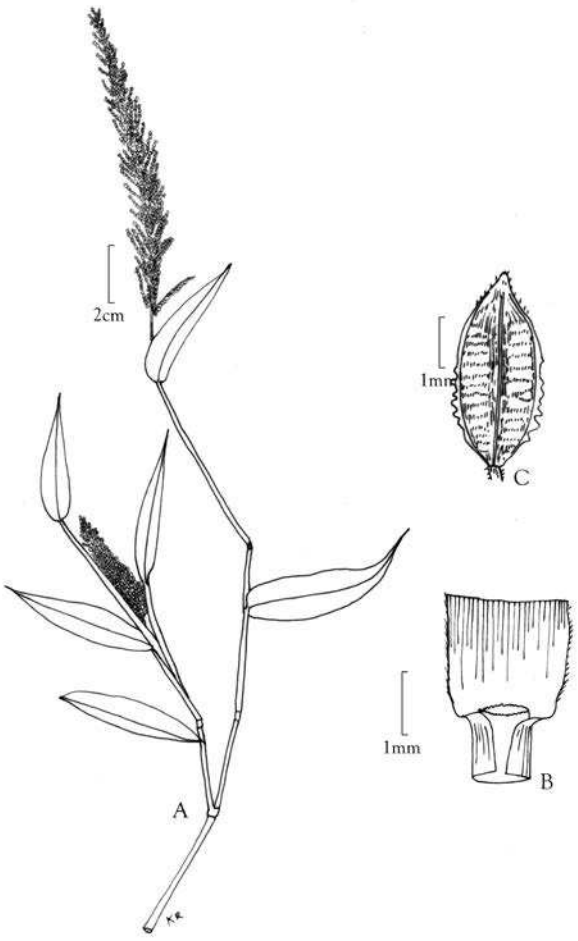


FIGURE 193. *Paspalum racemosum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet showing lower glume. A drawn from *Ezz el Din s.n.* (CAI); B drawn from *A. Goeldi* (US-1024756); C modified from Allen and Hall (2003).

Caespitose annuals. Culms 5–50 cm tall, decumbent; internodes scabrous; occasionally lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; oral hairs present; ligules 2 mm long, membranous, apex truncate; blades 5–12 cm long, 10–20 mm wide, flaccid, ascending, lanceolate or elliptic, flat, scabrous, margins scabrous, base cordate, apex acuminate. Racemes 0.5–2 cm long, numerous, closely spaced, unilateral, racemosely borne along a central axis. Spikelets 2.5–3.2 mm long, ovate, dorsally compressed, plano-convex, apex obtuse; upper glumes without ciliate margins; lemmas awnless. Habitat: disturbed sites, introduced. Distribution: (Nv) native to S America.

185. *Phalaris aquatica** L.

FIGURE 194

*Phalaris aquatica** L., Cent. Pl. I 4. 1755.
Common name: harding grass.

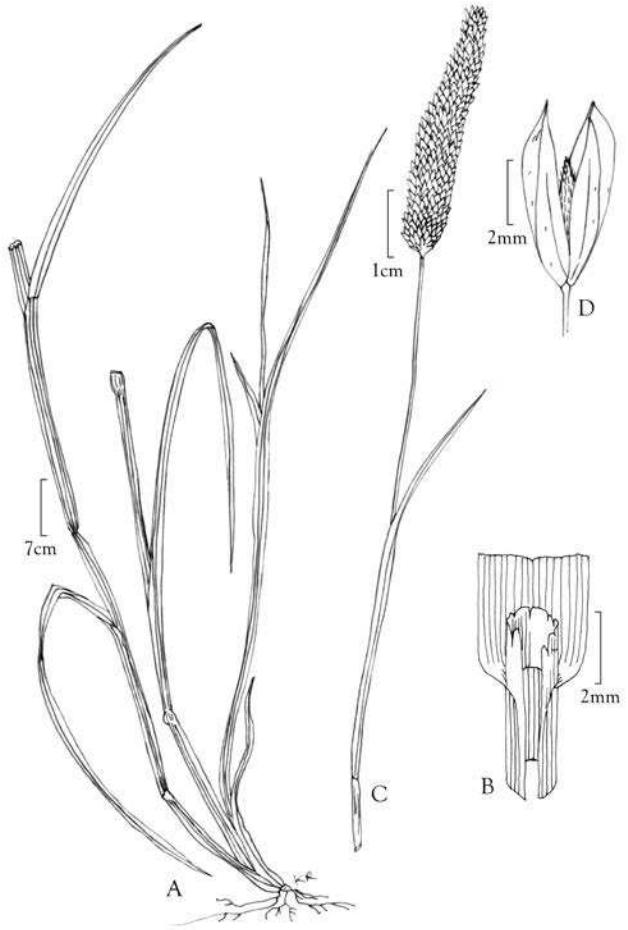


FIGURE 194. *Phalaris aquatica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *El Hadidi s.n.* (CAI); B, C drawn from *J. Schröder s.n.* (US-1445321); D modified from Barkworth (2007).

Caespitose perennials; rhizomes short. Culms erect up to 150 cm tall, often with swollen pseudocorms at the bases; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; ligules 2–4 mm long, membranous, apex erose; blades 5–25 cm long, 2–8 mm wide, linear-lanceolate, flat, spreading, flaccid, scabrous, margins smooth, apex acute. Panicles 1.5–11 cm long, 1–2.5 cm wide, spiciform, oblong. Spikelets 4.5–7.5 mm long, obovate, strongly laterally compressed; fertile lemma 3.1–4.6 mm long, awnless. Habitat: wet, disturbed sites, introduced. Distribution: (Mm) Mediterranean.

186. *Phalaris arundinacea** L.

FIGURE 195

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

Caespitose perennials; rhizomes elongate, scaly. Culms up to 200 cm tall, erect, geniculate; internodes glabrous; butt sheaths

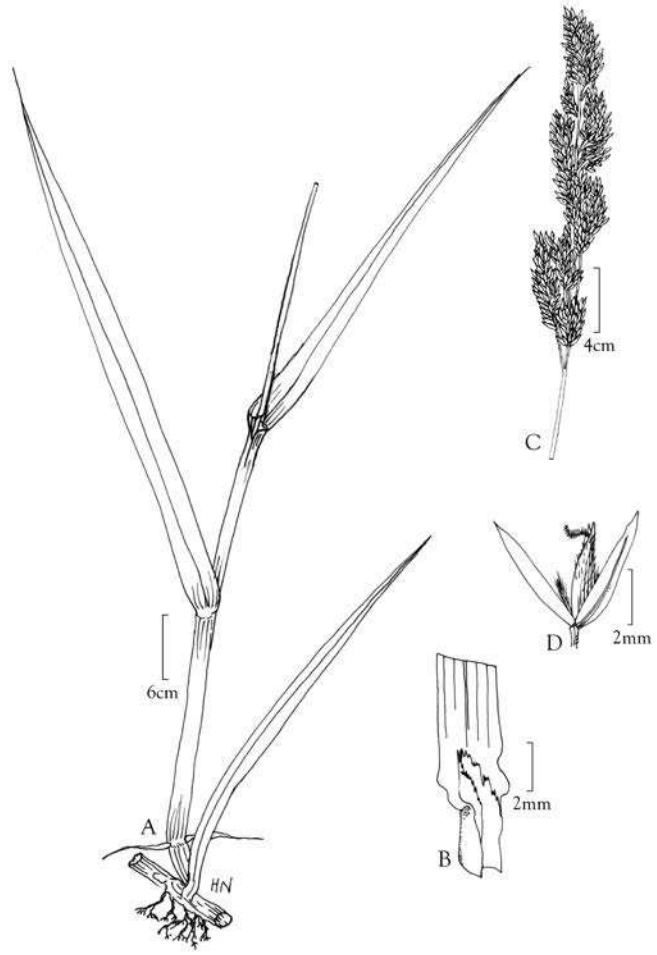


FIGURE 195. *Phalaris arundinacea.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *R. Kanal 363* (US-3214567); D modified from Barkworth (2007).

glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 6–10 mm, membranous, apex erose, truncate; blades 5–30 cm long, 4–15 mm wide, linear, flat, spreading, flaccid, scabrous, margins smooth, apex acute. Panicles 7–40 cm long, 1–4 cm wide, contracted, linear, interrupted, compact. Spikelets 3.5–7.5 mm long, ovate, laterally compressed; fertile lemmas 2.5–4.2 mm long, awnless. Habitat: weed of cultivation and waste places. Distribution: (Nv) probably of horticultural origin.

187. *Phalaris canariensis** L.

FIGURE 196

*Phalaris canariensis** L., Sp. Pl. 1: 54–55. 1753.
Common names: *akl asfour, kanari hindi*; canary grass.

Caespitose annuals. Culms 30–120 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, ribbed, margins smooth; ligules 6–10 mm long, membranous, apex erose; blades 5–25 cm long, 2–10 mm wide, linear, flat, spreading, flaccid, scabrous, margins smooth, apex acute. Panicles 1.5–6 cm long, 1.2–2.2 cm wide, compact, capitate. Spikelets 6–10 mm long, obovate, strongly laterally compressed; glume keels winged; fertile lemmas 4.5–6.8 mm long, awnless. Habitat: weed of cultivation, often introduced in bird seed. Distribution: (Mm, Nv) Mediterranean region.

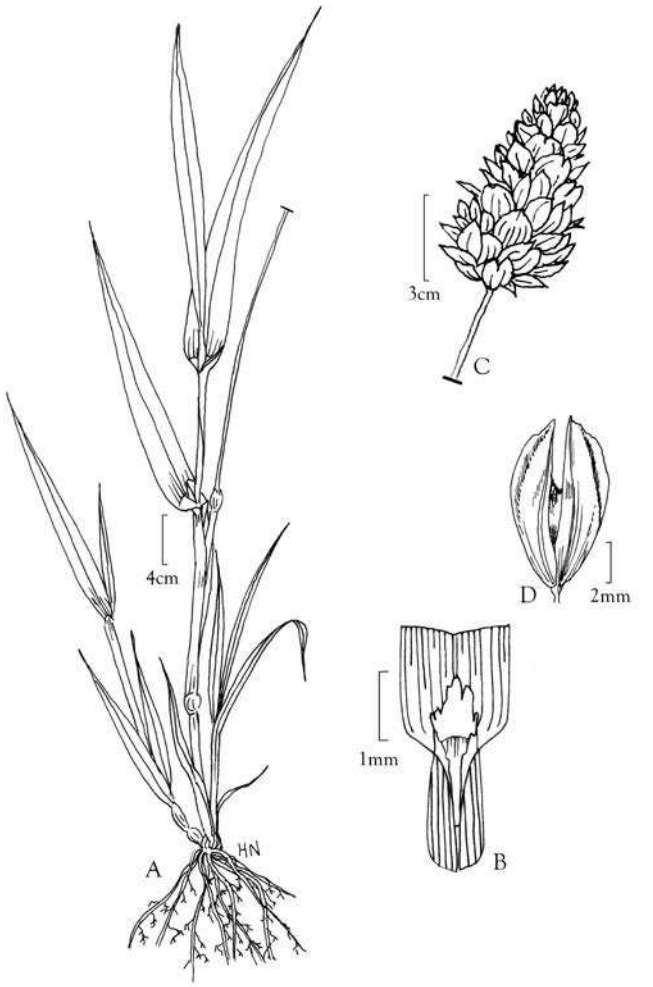


FIGURE 196. *Phalaris canariensis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *G. Vasey s.n.* (US-979920); D modified from Hitchcock (1951).

188. *Phalaris coerulescens* Desf.

FIGURE 197

Phalaris coerulescens Desf., Fl. Atlant.1: 56. 1798.
Common names: *khabaa*; sunolgrass.

Caespitose perennials. Culms up to 200 cm tall, erect, glabrous with swollen bases or pseudocorms; butt sheaths glabrous.

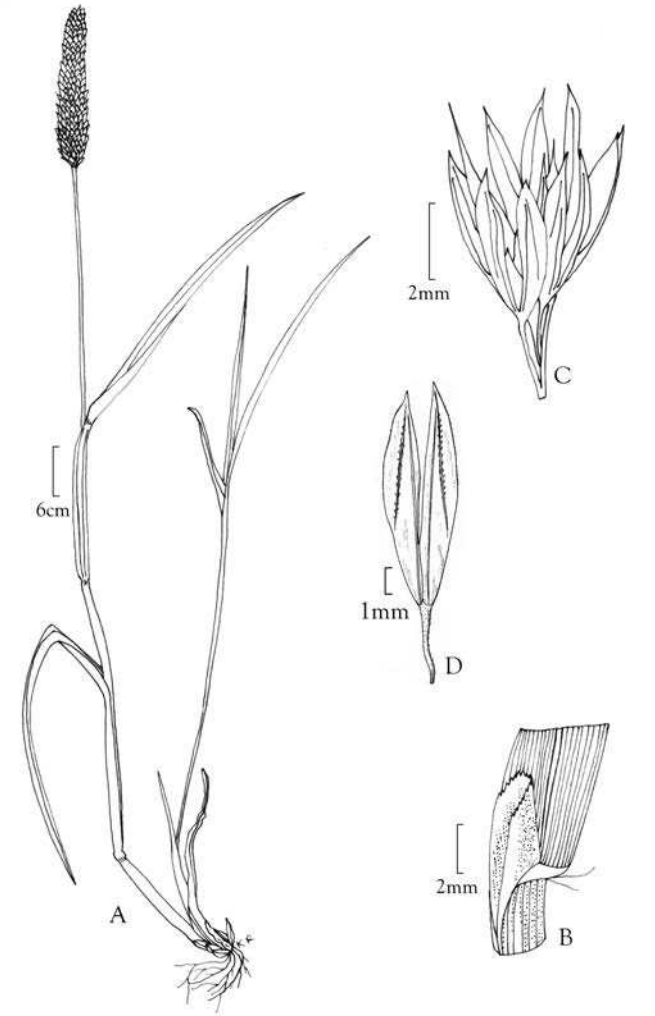


FIGURE 197. *Phalaris coerulescens.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence branch. D. Spikelet. A–D drawn from *F. Lamson Scribner s.n.* (US-745242).

Leaves basal and cauline; sheaths glabrous, margins smooth; collars broad; ligules 3–6 mm long, membranous, apex erose; blades 5–25 cm long, 1–3 mm wide, linear-lanceolate, flat, spreading, flaccid, scabrous, apex acuminate. Panicles 3–11 cm long, 1–2.3 cm wide, spiciform, linear or oblong. Spikelets 5.3–9 mm long, obovate, laterally compressed; glume keels winged; fertile lemmas 2.5–4.5 mm long, awnless. Habitat: damp soils and wadis. Distribution: (Di) Mediterranean region.

189. *Phalaris minor* Retz.

FIGURE 198

Phalaris minor Retz., Observ. Bot. 3: 8. 1783.
Common names: *ain el qott, kharfar, shaa'eer el far*; small canary grass.

Caespitose annuals. Culms 10–100 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; oral hairs present; collars dark; ligules 6–8 mm long, membranous, apex lacerate, truncate; blades 5–15 cm long, 3–10 mm wide, linear, flat, spreading, flaccid, scaberulous, apex acuminate. Panicles 1–6 cm long, 1–2 cm wide, spiciform or capitate, oblong or ovate, partially included in the sheath. Spikelets 4–6.5 mm long, elliptic, strongly laterally compressed; glume keels winged distally; fertile lemmas 2.7–4 mm long, awnless. Habitat: weed of cultivation and waste places, roadsides. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, Ol, S) Mediterranean to NW India.

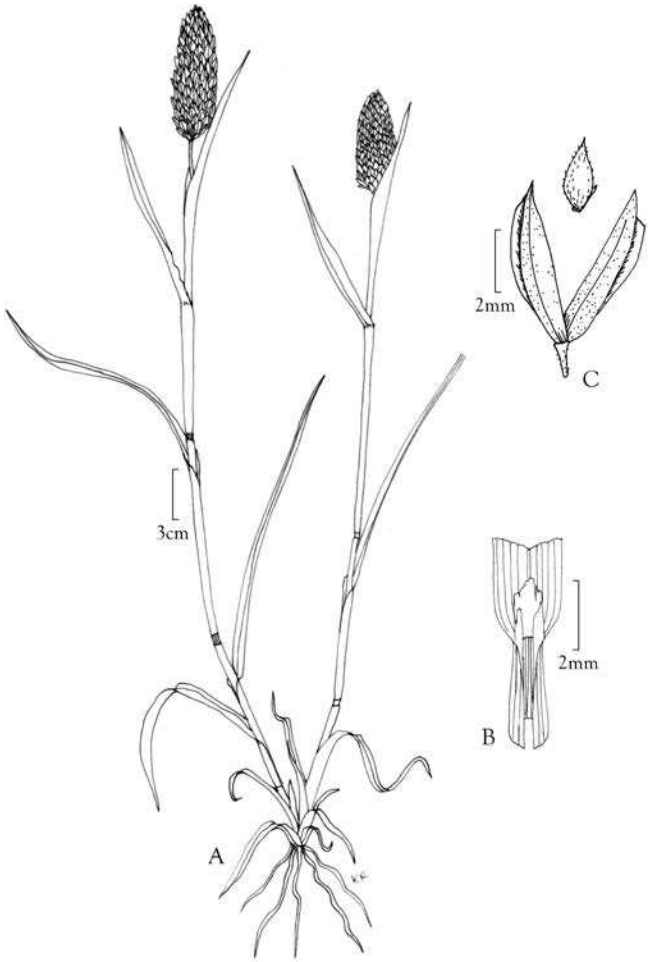


FIGURE 198. *Phalaris minor*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *L. Boulos s.n.* (CAI); B drawn from *L. Arnow s.n.* (US-2774275); C modified from Barkworth (2007).

190. *Phalaris paradoxa* L.

FIGURE 199

Phalaris paradoxa L., Sp. Pl. 2: 1665. 1763.
Common names: *sh'eer el far*; hood canary grass.

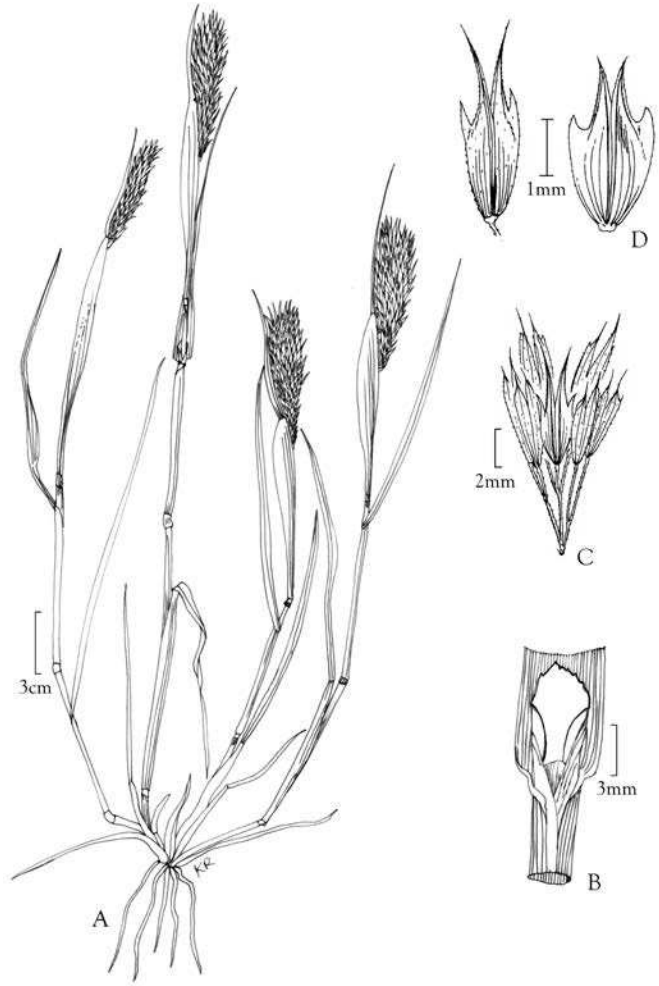


FIGURE 199. *Phalaris paradoxa*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence branch. D. Spikelets, sterile (left) and fertile (right). A drawn from *A. Amer s.n.* (CAI); B, C drawn from *G. Schweinfurth 497* (US-824588); D modified from Barkworth (2007).

Caespitose annuals. Culms 30–60 cm tall, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; oral hairs present; ligules 6–8 mm long, membranous, apex acute; blades 5–15 cm long, 2–5 mm wide, linear, flat, spreading, flaccid, glaucous, scabrous, margins smooth, apex acuminate. Panicles 4–10 cm long, 1.5–2.5 cm wide, erect, terminal, spiciform, subtended by inflated sheaths. Spikelets 7–8 mm long, ovate, laterally compressed; glumes winged with a toothlike projection near the middle; fertile lemmas 2.5–3.3 mm long, awnless. Habitat: moist places and weed of cultivation. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, Ol, On) Mediterranean to NW India.

191. *Phleum pratense** L.

FIGURE 200

*Phleum pratense** L., Sp. Pl. 1: 59. 1753.
Common names: herd's grass, timothy.

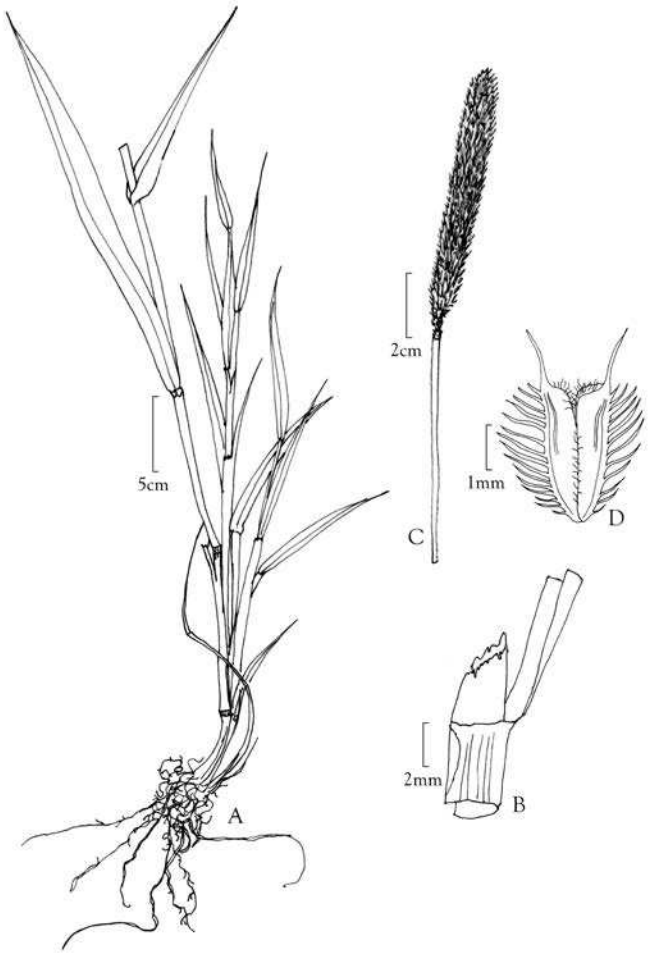


FIGURE 200. *Phleum pratense.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *H. A. Allard 7801* (US-1813276); D modified from Hitchcock (1951).

Caespitose perennials. Culms up to 150 cm tall, decumbent, sometimes swollen at the base; internodes glabrous; butt sheaths glabrous, dark brown. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 2–3 mm long, membranous, apex acute; blades 5–20 cm long, 2–8 mm wide, linear, flat, spreading, flaccid, scabrous, margins smooth, apex acute. Panicles (2–)6–15(–30) cm long, 0.6–2 cm wide, spiciform, linear. Spikelets 3–4 mm long, oblong, laterally compressed, apex truncate; glumes 3–4 mm long, 1-awned, the awns 1–2 mm long, geniculate, column twisted; lemmas (1.2–)1.6–2 mm long, hairy, awnless. Habitat: introduced as a pasture grass. Distribution: (Nv) Europe.

192. *Phleum subulatum** (Savi) Asch. & Graebn.

FIGURE 201

*Phleum subulatum** (Savi) Asch. & Graebn., Syn. Mitteleur. Fl. 2(1): 154. 1899.
Common names: *deil el-qott*; Italian timothy.

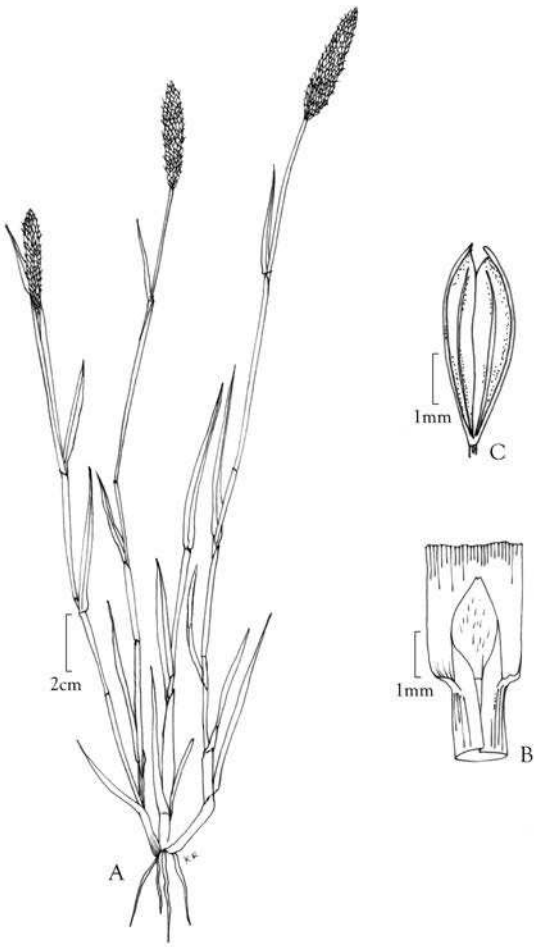


FIGURE 201. *Phleum subulatum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *M. Kalolimni 656* (US-785666), *L. F. Morlon 2842* (US-2464353).

Caespitose or solitary annuals. Culms 10–40 cm tall, decumbent, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 2–3 mm long, membranous, apex acute; blades 1–10 cm long, 1–3 mm wide, linear, flat, spreading, flaccid, glabrous, pilose or scaberulous, margins scabrous, bases truncate and rounded at the ends or tapering below, apex acuminate. Panicles 1–12 cm long, 0.3–0.9 cm wide, spiciform, linear. Spikelets (1.5–)2–4 mm long, elliptic, laterally compressed, apex truncate; glumes 2–4 mm long, awnless; lemmas ⅔ as long as the glumes, awnless. Habitat: introduced as a weed. Distribution: (S?) W and S Europe, Mediterranean region to Pakistan.

193. *Phragmites australis* (Cav.) Trin. ex Steud.

FIGURE 202

Phragmites australis (Cav.) Trin. ex Steud., Nomencl. Bot., ed. 2, 1: 143. 1840.

Common names: *boos khaba, ghab, hagna, qasab hegazi*; common reed.

Caespitose perennials; rhizomes elongated; stolons present. Culms up to 600 cm tall, erect, straight, reed, woody or bamboo-like, internodes glabrous; butt sheaths glabrous. Leaves cauline; sheaths glabrous, margins smooth; auricles rounded; oral hairs ciliate; ligules 1–1.5 mm long, ciliate membranes; blades 20–60 cm long, 8–30 mm wide, linear-lanceolate, flat, spreading, glabrous, margins smooth, apex attenuate. Panicles 15–45 cm long, 6–15(–20) cm wide, open, oblong, dense, feathery. Spikelets 12–18 mm long, cuneate, laterally compressed; rachilla hairs (4–)6–10 mm long; lemmas 8–15 mm long, awnless. Habitat: moist places, along rivers and drainages. Distribution: (Mm, Ms, Nv, Nn, Dl, Dg, Dn, Di, Ol, S, Ra, Rq, Rz) temperate regions of the world.

KEY TO SUBSPECIES

1a. Culms up to 4 m tall; panicle 15–20(–30) cm long; upper glumes lanceolate, apex sharply acute or apiculate . . . . . ***P. australis* subsp. *australis***

1b. Culms up to 6 m tall; panicles 30–45 cm long; upper glumes narrowly elliptic-oblong, apex obtuse to tridentate . . . . . ***P. australis* subsp. *altissimus* (Benth.) Clayton, Taxon 17(2): 169. 1968**



FIGURE 202. *Phragmites australis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *F. R. Fosberg 24808* (US-2681778); D modified from Cope (2005).

194. *Phragmites mauritianus** Kunth

FIGURE 203

*Phragmites mauritianus** Kunth, Révis. Gramin. 1: 277, t. 50. 1830.

Common names: *ghaab, ghaab reehi*; reed grass.

Caespitose perennials; rhizomes elongated. Culms up to 800 cm tall, erect, reed or woody, bamboo-like; internodes glabrous; butt sheaths glabrous. Leaves cauline; sheaths glabrous, margins smooth; collars dark colored; ligules 1–1.5 mm long, ciliate membranes; blades 20–70 cm long, 6–40 mm wide, linear-lanceolate, flat, spreading, scabrous, rough, margins smooth, apex attenuate-filiform. Panicles 30–50 cm long, 10–20 cm wide, open, oblong, dense. Spikelets 7–16 mm long, cuneate, laterally compressed; rachilla hairs 4–7 mm long; lemmas 8–9 mm long, awnless. Habitat: along water courses, introduced. Distribution: (Nv) tropical Africa.

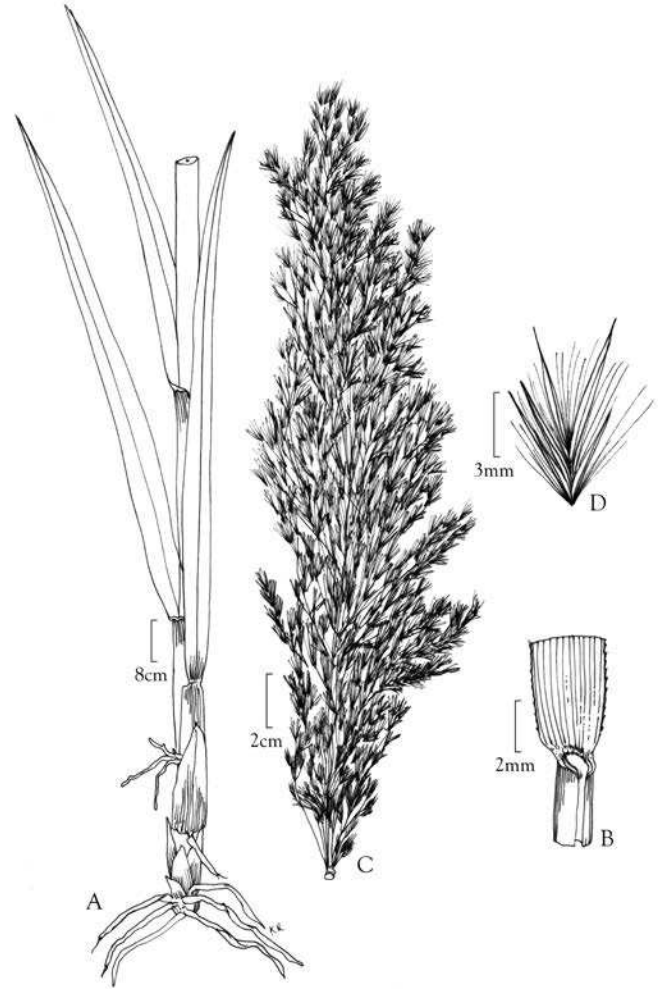


FIGURE 203. *Phragmites mauritianus*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *Drar 932* (CAI); B, C drawn from *J. Rodin 4551* (US-1983606); D drawn from *A. S. Hitchcock 24910* (US-1447072).

195. *Piptatherum holciforme* (M. Bieb.) Roem. & Schult.

FIGURE 204

Piptatherum holciforme (M. Bieb.) Roem. & Schult., Syst. Veg. 2: 328. 1817. [*Oryzopsis holciformis* (M. Bieb.) Hack.; *Agrostis holciformis* M. Bieb.]

Common names: *hemaar, hemri, reesh el hossein*.

Caespitose perennials. Culms up to 100 cm tall, erect, wiry, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths smooth or scaberulous, ribbed, margins membranous; ligules 3–6 mm long, membranous, apex lacerate; blades 6–20 cm long,



FIGURE 204. *Piptatherum holciforme*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Floret. A drawn from *N. El Hadidy, A. Hosny & Azza s.n.* (CAI); B–D drawn from *J. Bronmüller s.n.* (US-1109224).

4–8 mm wide, linear, flat, convolute, spreading, straight, ribbed, scabrous, margins scabrous, apex filiform. Panicles 20–35 cm long, 12–24 cm wide, open, ovate, effuse. Spikelets 8–10(–12) mm long, elliptic, dorsally compressed; principal lemma awns 8–13 mm long, straight, bristlelike. Habitat: stony slopes. Distribution: (S) Mediterranean region to SW Asia.

196. *Poa annua* L.

FIGURE 205

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

Caespitose annuals or short-lived perennials. Culms 3–20 cm tall, erect, geniculate or decumbent, rarely forming a corm; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, keeled, glabrous, margins smooth; ligules 1–3 mm long, membranous, apex truncate, obtuse; blades 1–14 cm long, 1–3 mm wide, linear, flat, convolute, spreading, straight, ribbed, scabrous, margins scabrous, apex filiform. Panicles 20–35 cm long, 12–24 cm wide, open, ovate, effuse. Spikelets 8–10(–12) mm long, elliptic, dorsally compressed; principal lemma awns 8–13 mm long, straight, bristlelike. Habitat: stony slopes. Distribution: (S) Mediterranean region to SW Asia.

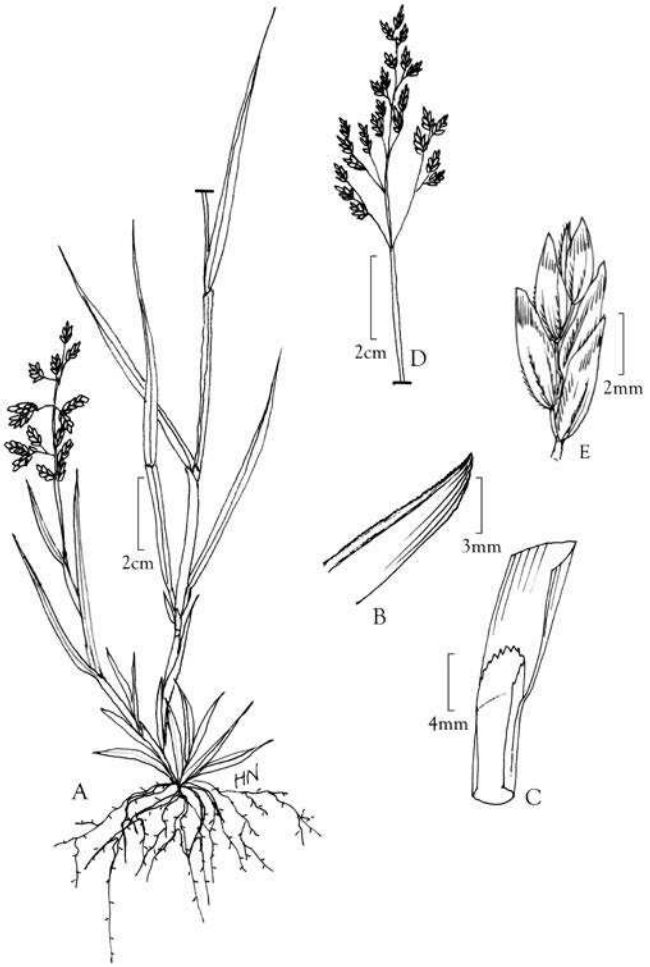


FIGURE 205. *Poa annua.* A. Habit. B. Leaf tip. C. Ligule, sheath, and blade. D. Inflorescence. E. Spikelet. A–D drawn from *F. R. Fosberg 55144* (US-2681617); E modified from Soreng (2007).

197. *Poa diaphora* Trin.

FIGURE 206

Poa diaphora Trin., Mém. Acad. Imp. Sci. Saint-Pétersbourg, sér. 6, Sci. Math., Seconde Pt. Sci. Nat. 4,2(1): 69–70. 1836. [*Eremopoa altaica* (Trin.) Roshev.]
Common name: altai grass.

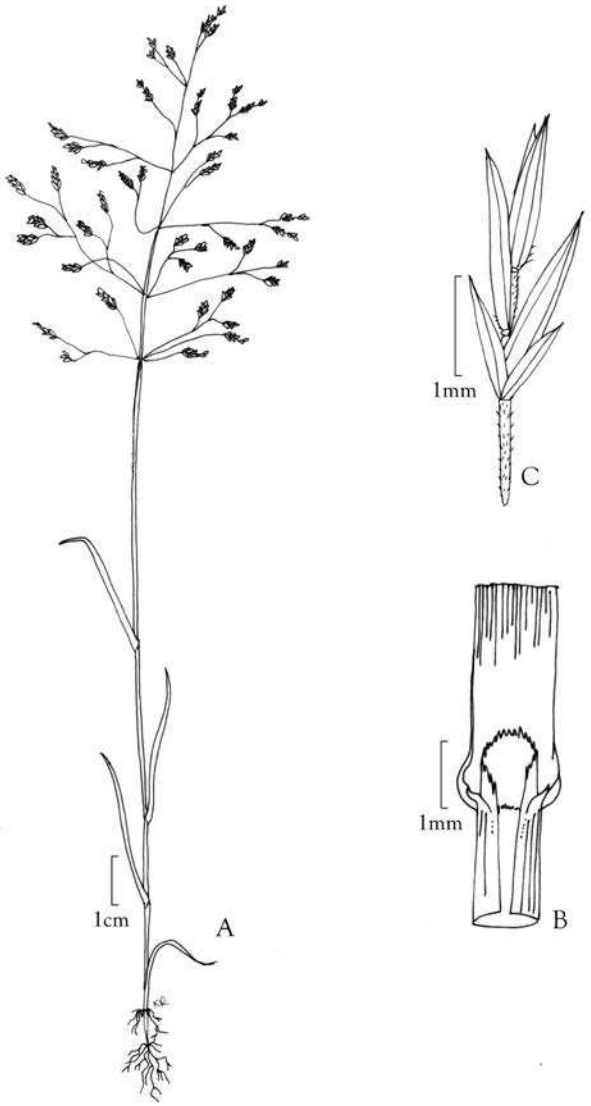


FIGURE 206. *Poa diaphora.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *J. Gay 1343* (US-914495).

Caespitose annuals. Culms 10–20 cm tall, erect, rough; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than adjacent internodes, glabrous, margins smooth; ligules 1–3 mm long, membranous, apex lacerate; blades 10–20 cm long, 3–10 mm wide, linear, flat, straight, spreading, scaberulous, margins cartilaginous, apex acuminate. Panicles 7–18 cm long, 1–6 cm wide ovate or elliptic. Spikelets 4–6.5 mm long, laterally compressed; lemmas 2–4 mm long; awnless; anthers 0.4–0.6 mm long. Habitat: rocky slopes. Distribution: (S) SW and C Asia to Afghanistan.

198. *Poa infirma* Kunth

FIGURE 207

Poa infirma Kunth, Nov. Gen. Sp. 1: 158. 1816.
Common name: early meadow grass.

Caespitose annuals. Culms 5–25 cm tall, erect, geniculate or decumbent, weak; internodes glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths flattened, opened, surfaces glabrous, margins smooth; ligules 1–3 mm long, membranous, apex obtuse; blades 5–25 cm long, 2–8 mm wide, linear, flat, spreading, flaccid, glabrous, margins scabrous, apex hooded or abruptly acute. Panicles 0.5–10 cm long, open, lanceolate or ovate, dense or loose. Spikelets 2–4 mm long, oblong or ovate, laterally compressed; lemmas 2–2.5 mm long, awnless; anthers 0.2–0.5 mm long. Habitat: moist meadows and weed of cultivation. Distribution: (Mm, Nv, Di) S Europe to northern India and SW Asia, introduced in America.

199. *Poa persica* Trin.

FIGURE 208

Poa persica Trin., Mém. Acad. Imp. Sci. Saint-Pétersbourg, sér. 6, Sci. Math. 1(4): 373. 1830. [*Eremopoa persica* (Trin.) Roshev.]

Caespitose annuals. Culms 5–50 cm tall, erect, geniculate; butt sheaths glabrous. Leaves basal and cauline; sheaths longer

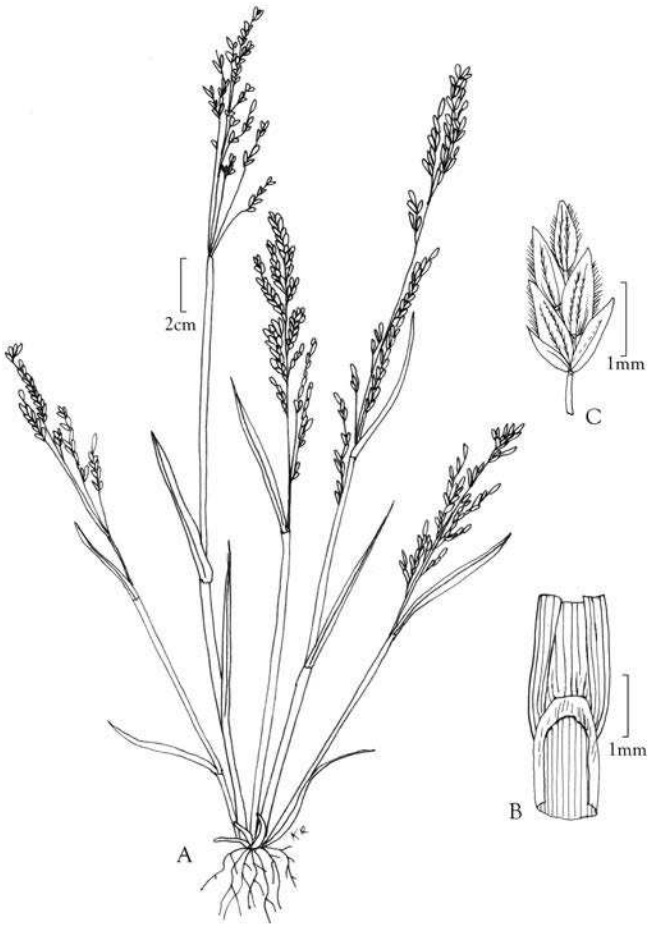


FIGURE 207. *Poa infirma.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *H. L. Shantz 25* (US-1090862).

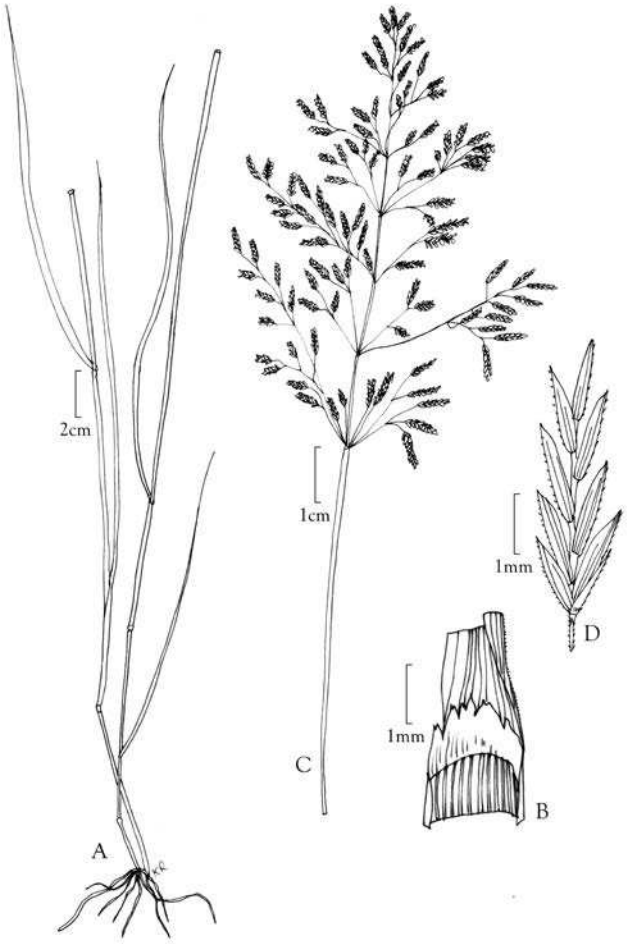


FIGURE 208. *Poa persica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *N. Sankry s.n.* (CAI); B–D drawn from *J. Bornmuller* (US-1127610, 127596).

than adjacent internodes, glabrous, ribbed, margins smooth; ligules 1–3 mm long, membranous, apex lacerate; blades 2–8 cm long, 1–2 mm wide linear, flat, flaccid, ascending, ribbed, scabrous, margins smooth, apex acute. Panicles 6–17 cm long, (1.5–) 3–5 cm wide, open, ovate. Spikelets 4–8.5 mm long, elliptic, laterally compressed; lemmas 3–3.5 mm long, mucronate, awnless; anthers 1.4–2.6 mm long. Habitat: sandy and stony soils. Distribution: (Mm) Mediterranean and tropical E Africa.

200. *Poa sinaica* Steud.

FIGURE 209

Poa sinaica Steud., Syn. Pl. Glumac. 1: 256. 1854.
Common names: *anse'a, sabal abu el hussein*; Sinai meadow grass.

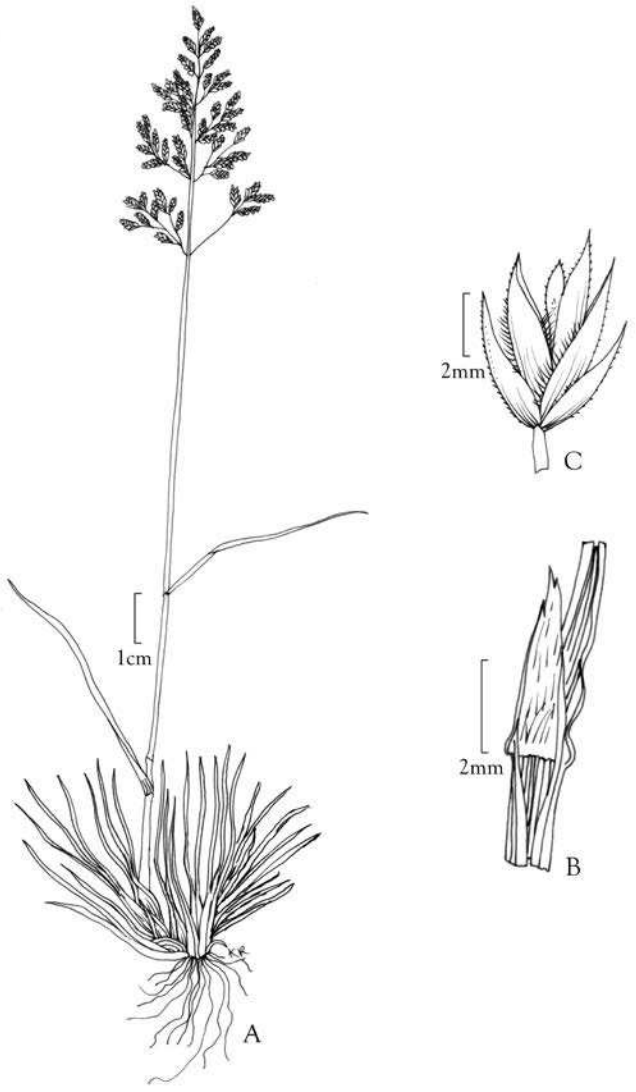


FIGURE 209. *Poa sinaica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *N. Sincari s.n.* (CAI); B, C drawn from *J. C. Archibald 1751* (US-3003842), *L. E. Long 368* (US-2209744).

Caespitose perennials. Culms 10–60 cm tall, erect, geniculate, weak, base swollen; internodes glabrous; nodes dark; butt sheaths glabrous, the remains of old leaf sheaths form bulbous swelling. Leaves mostly basal; sheaths glabrous, ribbed, margins membranous; ligules 2–4 mm long, membranous, apex acute; blades 5–25 cm long, 2–8 mm wide, linear, conduplicate or involute, ascending, straight, scabrous, margins ciliate, apex abruptly acute. Panicles (3–)6–13 cm long, open, elliptic or oblong, dense. Spikelets 6–8 mm long, compressed, elliptic or oblong, laterally compressed; lemmas 3.5–5 mm long, awnless; anthers 1.5–2.5 mm long. Habitat: desert slopes and weed of cultivation. Distribution: (Dg, Di, S) SW Asia to N India.

201. *Pogonatherum paniceum** (Lam.) Hack.

FIGURE 210

*Pogonatherum paniceum** (Lam.) Hack., Allg. Bot. Z. Syst. 12: 178. 1906.
Common name: baby bamboo.

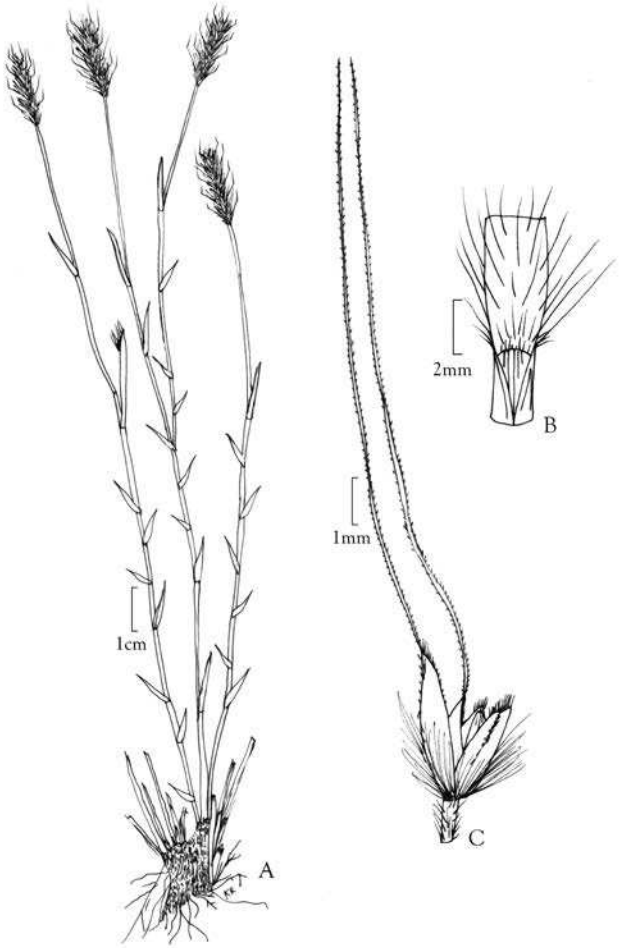


FIGURE 210. *Pogonatherum paniceum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *M. Mahdi s.n.* (CAI); B, C drawn from *I. S. Collenett 7299* (K-H.2012/00899-11).

Mat-forming perennials. Culms 15–60 cm tall, prostrate, stiff, wiry; internodes glabrous; butt sheath glabrous. Leaves basal and cauline; sheaths glabrous; ligule a fringe of hairs; blades 2–20 cm long, 1–3 mm wide, flat or spreading, glabrous, margins smooth, apex acute. Racemes 2–4 cm long, single, straight or arcuate, borne on a flexuous peduncle. Spikelets 2.5–3 mm long, in pairs, elliptic, laterally compressed; upper glumes 1-awned, awns 8–22 mm long; fertile lemma 2–3 mm long, awns 8–22 mm long, flexuous. Habitat: cultivated ornamental grass. Distribution: (Nv) native of tropical Asia and Australia.

202. *Polypogon maritimus* Willd.

FIGURE 211

Polypogon maritimus Willd., Ges. Naturf. Freunde Berlin Neue Schriften 3: 442. 1801. Common name: Mediterranean rabbitsfoot grass.

Caespitose annuals; rhizomes short. Culms 10–30 cm tall, erect, geniculate; internodes glabrous, glossy; nodes dark; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, ribbed, margins smooth; ligules 2–3 mm long, membranous, apex acute; blades 2–5 cm long, 2–3 mm wide, linear; conduplicate, ascending, reflexed, scabrous, margins scabrous, apex acuminate. Panicles 2–5 cm long, 1–1.5 cm wide, spiciform, linear or oblong, sometimes very dense and bristly. Spikelets 3–7 mm long, cuneate, laterally compressed; glumes 2–2.5 mm long, 1-awned, awns 3–7 mm long, spinously scabrid below, margins ciliate above; lemmas 1.2–1.3 mm long, awnless. Habitat: alluvial soils, coastal sands, and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Dg, Di, Ol, On, Ra, S) Europe, Mediterranean region to C Asia.

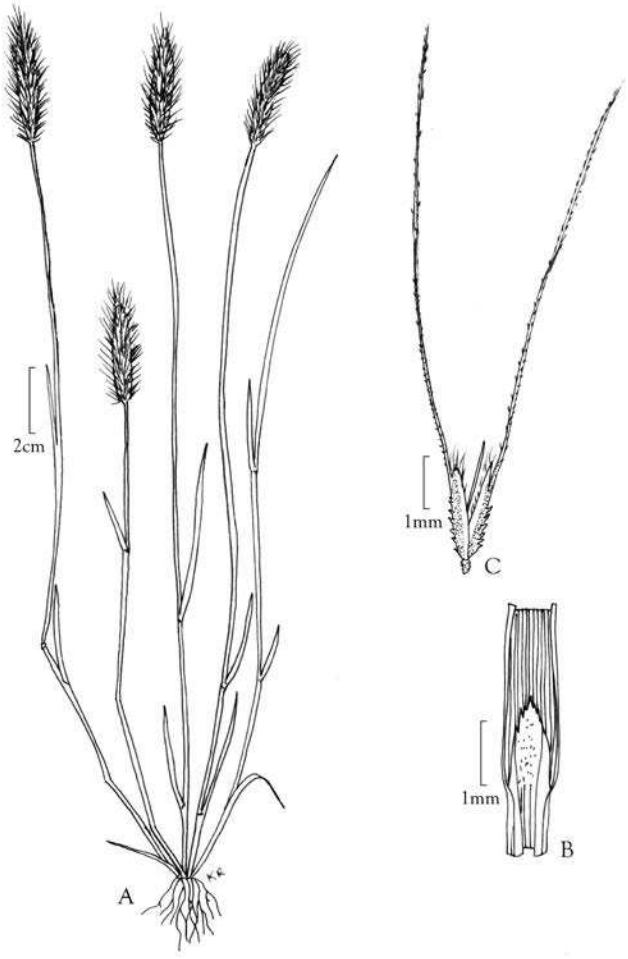


FIGURE 211. *Polypogon maritimus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *J. P. Sinleris s.n.* (US-1109333).

203. *Polypogon monspeliensis* (L.) Desf.

FIGURE 212

Polypogon monspeliensis (L.) Desf., Fl. Atlant. 1: 67. 1798. Common names: *deil el qott, deneb el far, reesh el huossein*; rabbit's foot.

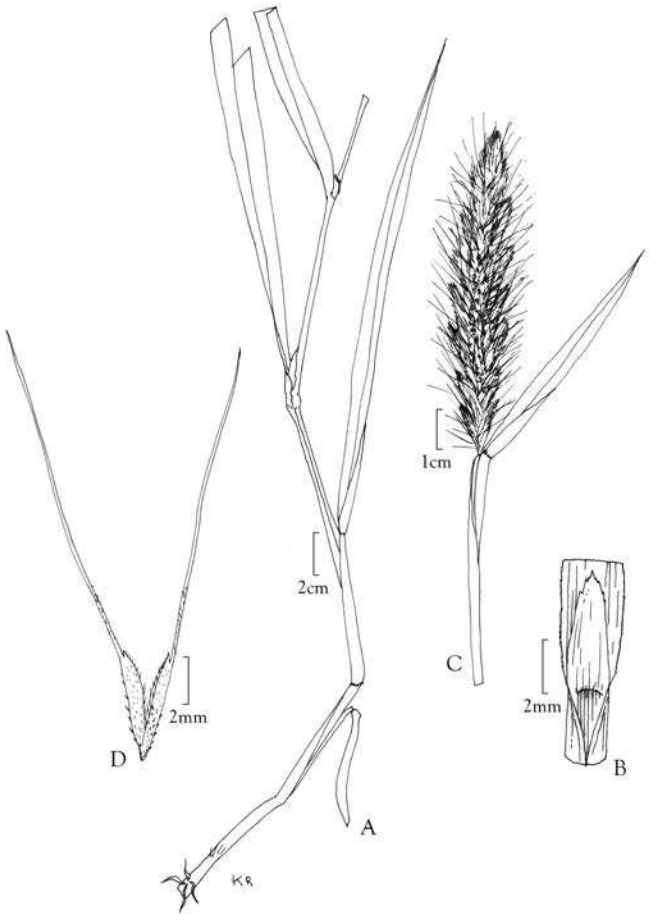


FIGURE 212. *Polypogon monspeliensis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from *F. A. Barkley & H. Abbas 1820* (US-2381497).

Caespitose perennials; rhizomes elongated. Culms 5–50 cm tall long, erect, geniculate; internodes glabrous, glossy; nodes dark; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, ribbed, margins smooth; ligules 5–6 mm long, membranous, apex acute, lacerate; blades 5–20 cm long, 2–7 mm wide, linear, ascending, reflexed, scaberulous, margins scabrous, bases amplexicaul, apex acuminate. Panicles 1.5–16 cm long, 1–3.5 cm wide, spiciform, oblong or ovate, continuous or interrupted. Spikelets 2–3 mm long, oblong, laterally compressed; glumes scabrous, 1-awned, awns 4–7 mm long; lemmas 1–1.5 mm long, hyaline, unawned or with an awn up to 2 mm long. Habitat: moist sites, waste places, and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Dg, Da, Di, Ol, On, S, Ra) Europe, Mediterranean, and temperate Asia.

204. *Polypogon viridis* (Gouan) Breistr.

FIGURE 213

Polypogon viridis (Gouan) Breistr., Bull. Soc. Bot. France 110 (89): 56. 1963.

Common names: *deil el faar, no'eima*; water bent, water beardgrass.

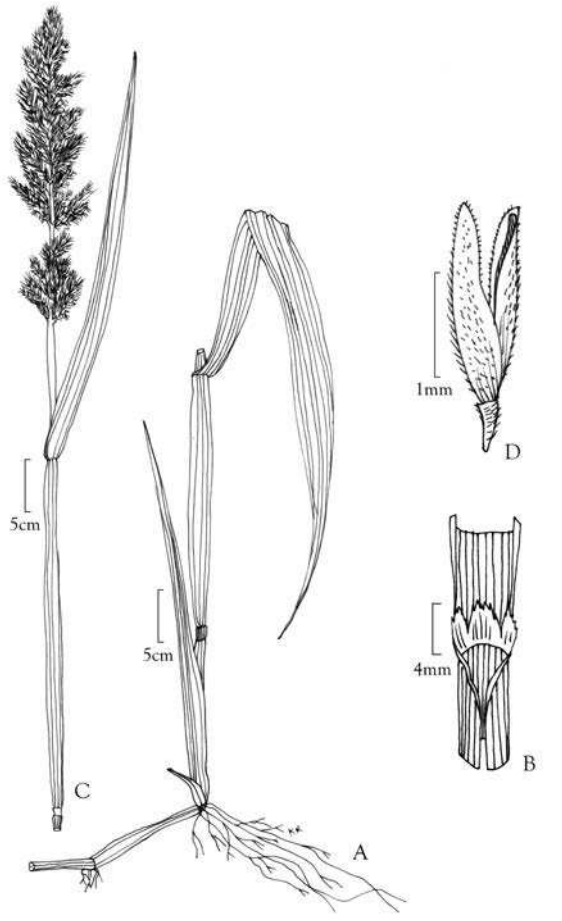


FIGURE 213. *Polypogon viridis.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *N. El Hadidi s.n.* (CAI); B–D drawn from *E. R. Sohns 524* (US-2118506).

Caespitose perennials; stolons sometimes present. Culms 25–90 cm tall, erect, geniculate; internodes glabrous, glossy; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, ribbed, margins smooth; ligules 3–5 mm long, membranous, apex acute; blades 2–15 cm long, 2–5 mm wide, linear-lanceolate, ascending, reflexed, scaberulous, margins scabrous, bases amplexicaul, apex acuminate. Panicles 2–8(–11) cm long, 0.5–4 cm wide, contracted, oblong or ovate, interrupted. Spikelets 1.75–2 mm long, elliptic laterally compressed; glumes scabrous, awnless; lemmas 1–1.5 mm long, hyaline, awnless. Habitat: wet sites and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Dg, Di, Ol, S, Rq, Rz) Europe, Mediterranean region to C Asia.

205. *Rostraria cristata* (L.) Tzvelev

FIGURE 214

Rostraria cristata (L.) Tzvelev, Novosti Sist. Vyssh. Rast. 7: 47. 1971.

Common names: *abu muashi*; Mediterranean hairgrass.

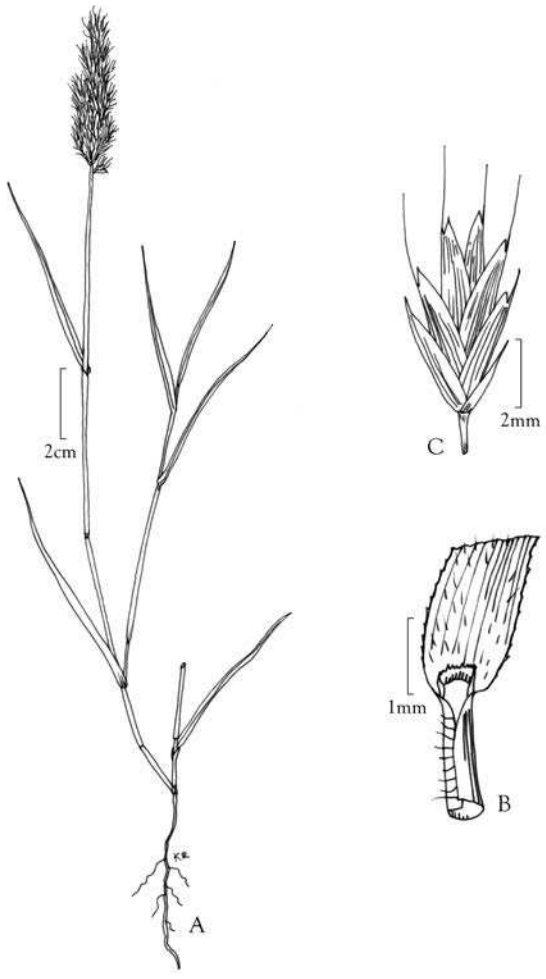


FIGURE 214. *Rostraria cristata.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *E. Crum 1446* (US-2015000).

Caespitose perennials. Culms 5–30 cm tall, erect, geniculate; internodes glabrous, glossy; butt sheaths persistent, glabrous. Leaves mostly basal; sheaths hairy, margins membranous; ligules 0.5–2 mm long, membranous, apex erose, truncate; blades 5–20 cm long, 1–3 mm wide, linear, convolute, ascending, reflexed, glabrous or pubescent, margins hairy, apex acuminate. Panicles 1.5–10 cm long, 0.6–1.6 cm wide, elongated, compact, linear or lanceolate, continuous or interrupted, branches smooth or scaberulous. Spikelets 3–7 mm long, oblong, laterally compressed; lemmas 2.5–4 mm long, mucronate or awned, the awns up to 3 mm long, straight. Habitat: desert sand, waste places, and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Dg, Di, Ol, On, S) Mediterranean to NW India.

206. *Rostraria hispida* (Savi) Doğan

FIGURE 215

Rostraria hispida (Savi) Doğan, Notes Roy. Bot. Gard. Edinburgh 40(3): 509. 1983.

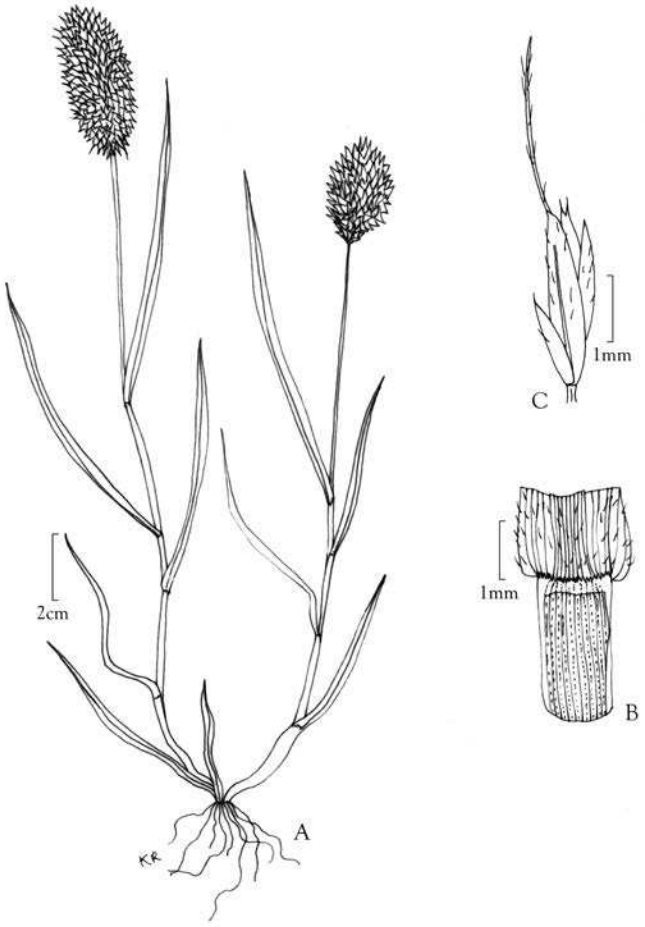


FIGURE 215. *Rostraria hispida.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *J. Gay* (US-869440).

Caespitose annuals. Culms 5–30 cm tall, erect, geniculate; internodes glabrous, glossy; butt sheaths glabrous. Leaves basal and cauline; sheaths hairy, ribbed, margins sparsely hairy; ligules 0.5–1 mm long, membranous, apex truncate; blades 5–10 cm long, 1–7 mm wide, linear, flat, ascending, reflexed, sparsely hairy to pilose, margins scabrous, apex attenuate. Panicles 1–6 cm long, 0.7–1 cm wide, spiciform, oblong or ovate. Spikelets 4–5 mm long, oblong, laterally compressed; lemmas 3–4.5 mm long, awns 3–5 mm long, straight, bristly. Habitat: desert sand and seasonally wet sites. Distribution: (Mm?) Mediterranean region.

207. *Rostraria obtusiflora* (Boiss.) Holub

FIGURE 216

Rostraria obtusiflora (Boiss.) Holub, Folia Geobot. Phytotax. 9(3): 271. 1974.

Caespitose annuals. Culms 15–50 cm tall, erect, geniculate; internodes glabrous, glossy; butt sheaths glabrous. Leaves mostly basal; sheaths flattened, glabrous, margins membranous;

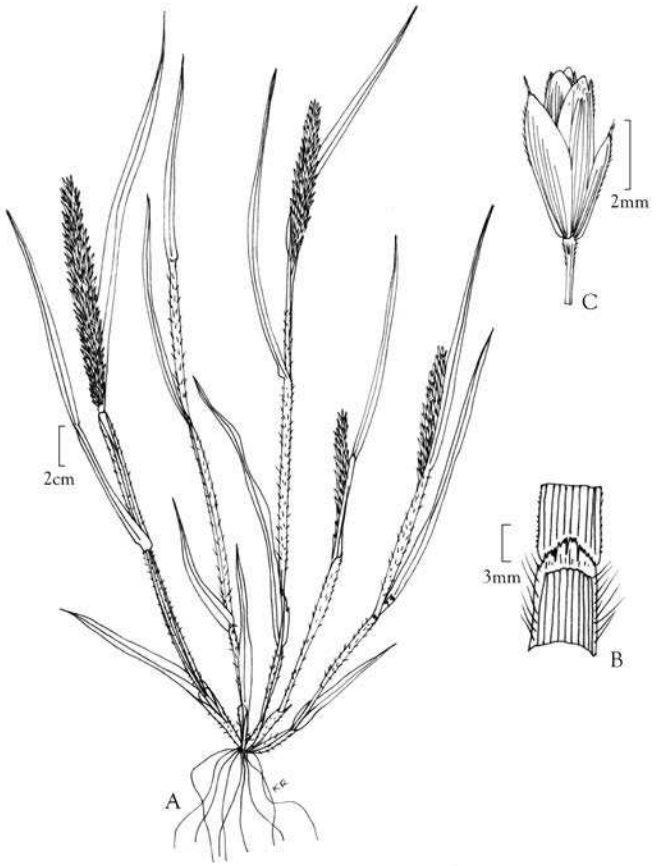


FIGURE 216. *Rostraria obtusiflora.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *K. A. Barkley & S. Bahaeddin 1522* (US-2381441).

ligules 1–2 mm long, membranous, apex lacerate, truncate; blades 5–10 cm long, 1–4 mm wide, linear, convolute, ascending, straight, glabrous or sparsely hairy, margins scabrous, apex acuminate. Panicles 3–7 cm long, 0.5–1 cm wide, spiciform, linear or lanceolate, compact. Spikelets 3–7 cm long, 0.5–1 cm wide, spiciform, linear, or lanceolate; lemmas 4 mm long, apex mucronate, awnless. Habitat: sandy soils. Distribution: (Ms) Turkey, Cyprus, and Syria.

208. *Rostraria pumila* (Desf.) Tzvelev

FIGURE 217

Rostraria pumila (Desf.) Tzvelev, Novosti Sist. Vyssh. Rast. 7: 48. 1970.

Caespitose perennials. Culms 5–50 cm tall, erect, geniculate; internodes pubescent, glossy; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins sparsely hairy; ligules 1–2 mm long, membranous, apex obtuse, lacerate; blades 2–10 cm long, 1–2 mm wide, linear, flat, spreading, flaccid, glabrous or hirsute, margins scabrous, bases tapering, apex obtuse or abruptly acute. Panicles 1–6 cm long, 0.4–0.5 cm wide, spiciform, oblong or ovate, continuous or interrupted. Spikelets 2.5–3.5 mm long, oblong, laterally compressed; lemmas 3–3.5 mm long, awns 2–3 mm long, straight, bristly. Habitat: alluvial soils and a weed of cultivation. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, S, Ra, Ge) Mediterranean to NW India.

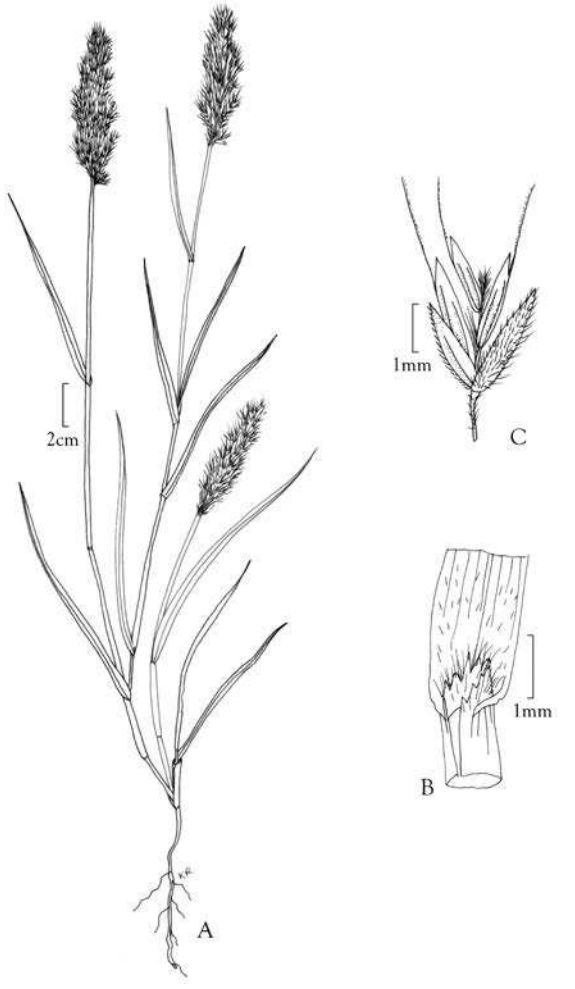


FIGURE 217. *Rostraria pumila.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm 707* (CAI); B drawn from *T. R. Soderstrom 1474* (US-2915765); C modified from Cope (2005).

209. *Rostraria rohlfsii* (Asch.) Holub

FIGURE 218

Rostraria rohlfsii (Asch.) Holub, Folia Geobot. Phytotax. 9(3): 272. 1974.

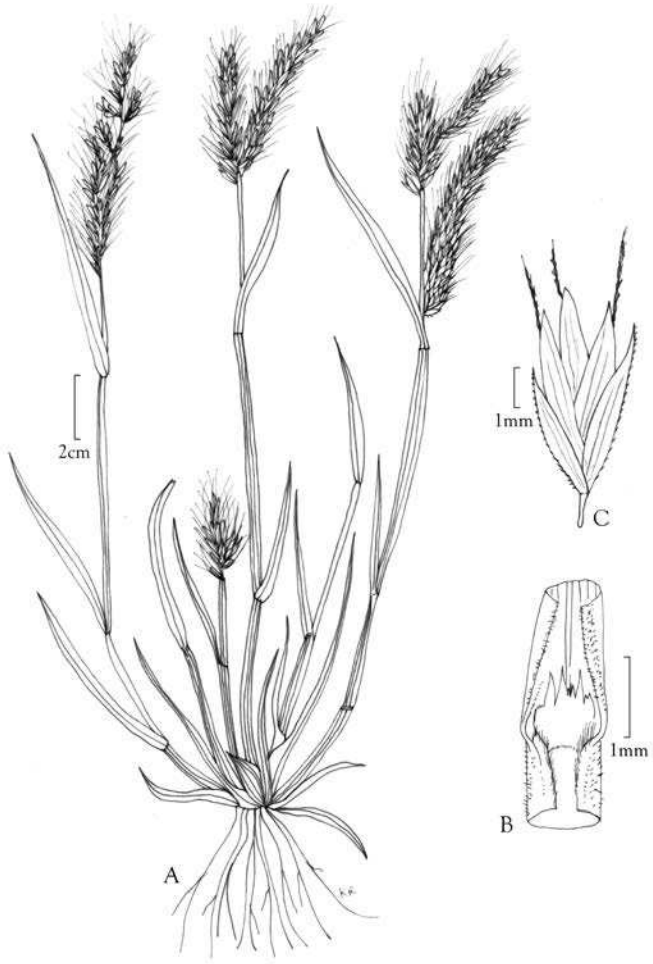


FIGURE 218. *Rostraria rohlfsii.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Abd El-Ghani 1577* (CAI); B drawn from *L. Chevallier* (US-1130383); C modified from Cope (2005).

Caespitose annuals. Culms 5–30 cm tall, erect, geniculate; internodes glabrous, ribbed; butt sheaths glabrous. Leaves mostly basal; sheaths pubescent, ribbed, margins smooth; ligules 0.5–1 mm long, membranous, apex lacerate; blades 1–10 cm long, 1–2 mm wide, flat, spreading, reflexed, pubescent, margins cartilaginous, base cordate, apex abruptly acute. Panicles 3–10 cm long, 0.6–1 cm wide, spiciform, linear or lanceolate. Spikelets 4–5.5 mm long, oblong or obovate, laterally compressed; lemmas 3–4 mm long, awns 1–3 mm long, subterminal, straight, bristly. Habitat: sandy sites (Bahariya Oasis) and a weed of cultivation. Distribution: (Ol) Sahara region.

210. *Saccharum officinarum** L.

FIGURE 219

*Saccharum officinarum** L., Sp. Pl. 1: 54. 1753.
Common names: *qassab el sokar*; sugarcane.

Solitary perennials; rhizomes short. Culms up to 400 cm tall, reedlike, erect; internodes glabrous, glossy; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than adjacent internodes, overlapping, glabrous, margins smooth; ligule a ciliate membrane; blades 50–150 cm long, 3–60 mm wide, linear or narrowly lanceolate, flat, spreading, reflexed, mid-rib conspicuous, scabrous, margins scabrous, base cordate, apex acuminate. Panicles 40–60 cm long, open, pyramidal, dense. Spikelets 3.5–4 mm long, in pairs, lanceolate, dorsally compressed, surrounded by hairs; lemmas 0.1–1 mm long, awnless. Habitat: cultivated sugarcane fields. Distribution: (Nv, Nn) tropical.

211. *Saccharum spontaneum* L.

FIGURE 220

Saccharum spontaneum L., Mant. Pl. 2: 183. 1771.
Common names: *bous, bous el ghazair, bous qallam, ghab farsi, heesh*; wild cane.

Solitary perennials; rhizomes elongated. Culms up to 500 cm tall, solid, erect; internodes glabrous, glossy; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous, margins smooth; oral hairs sometimes present; ligules 1–1.5 mm long, ciliate membranes; blades 50–200 cm long, 5–40 mm wide, linear, flat, spreading, reflexed, scabrous, base narrow, apex acuminate. Panicles 20–50 cm long, open, ovate, densely flowered; racemes 3–15 cm long; primary branches 5–10 cm long, whorled at most nodes. Spikelets 3.5–7 mm long, in pairs, lanceolate, dorsally compressed, surrounded by hairs; lemmas 1–2 mm long, awnless. Habitat: moist places and margins of cultivated fields. Distribution: (Mm, Ms, Nv, Nn, S) tropics and warm temperate Asia.

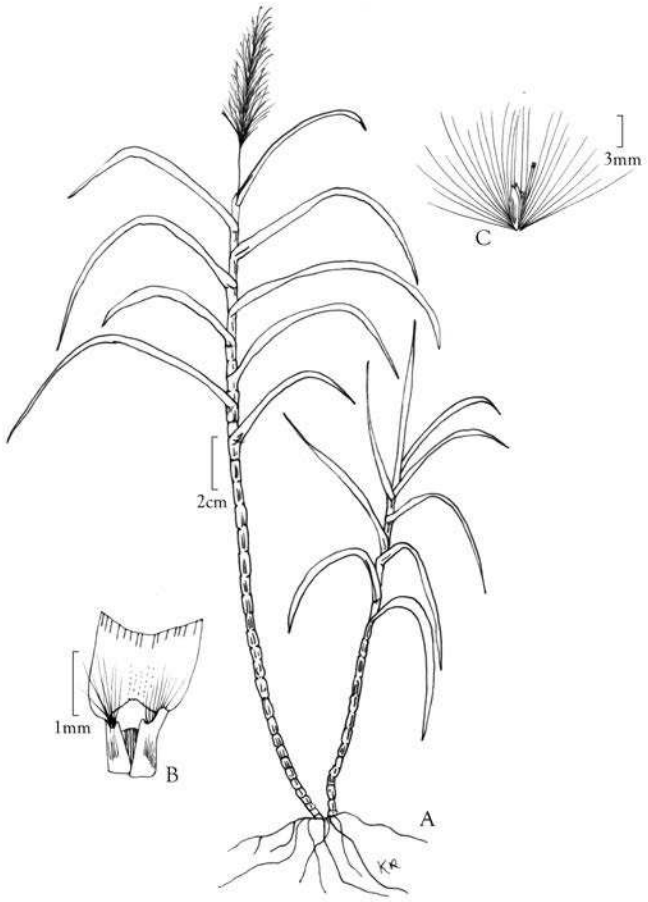


FIGURE 219. *Saccharum officinarum.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A modified from Hitchcock (1951); B drawn from *A. Henry 1688* (US-455669); C drawn from *A. Raya & El Hadidi s.n.* (CAI), Ibrahim and Kabuye (1988).

KEY TO THE SUBSPECIES

1a. Leaf blades petiolate at the base; laminas up to 7.5 mm wide, gradually reduced to a narrow wing on either side of the midrib; ligule triangular . . . . . ***S. spontaneum* subsp. *spontaneum***
1b. Leaf blades not petiolate at the base; lamina 5–15(–40) mm wide: ligule crescent shaped . . . . . ***S. spontaneum* subsp. *aegyptiacum* (Willd.) Hack, Monogr. Phan. 6: 115. 1889**

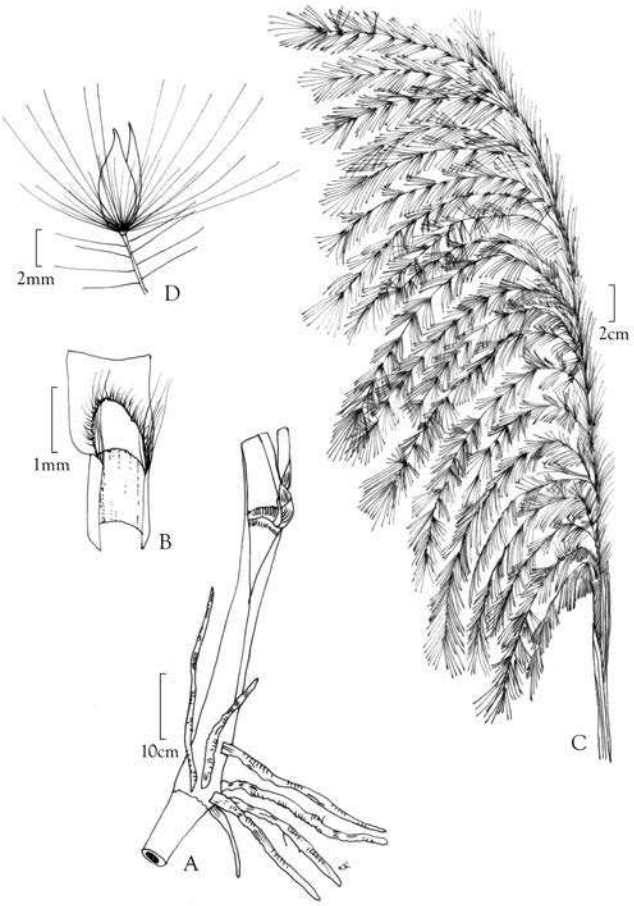


FIGURE 220. *Saccharum spontaneum*. A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm s.n.* (CAI); B, C drawn from *A. Pappi s.n.* (US-1984411); D modified from Ibrahim and Kabuye (1988).

212. *Schismus arabicus* Nees

FIGURE 221

Schismus arabicus Nees, Fl. Afr. Austral. Ill. 1: 422. 1841.

Caespitose annuals. Culms 3–20 cm tall, erect, geniculate or decumbent; internodes glabrous, weak; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; oral hairs present; ligule a fringe of hairs; blades 1–10 cm long, 0.5–2 mm long, filiform, convolute, ascending, scabrous, apex acuminate. Panicles 1–5 cm long, contracted, lanceolate or elliptic. Spikelets 5–7 mm long, oblong, laterally compressed; lemmas 2.5–3.3 mm long, bilobed, mucronate between the lobes. Habitat: sandy and gravel soils. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, S, Ge) E Mediterranean to C Asia.

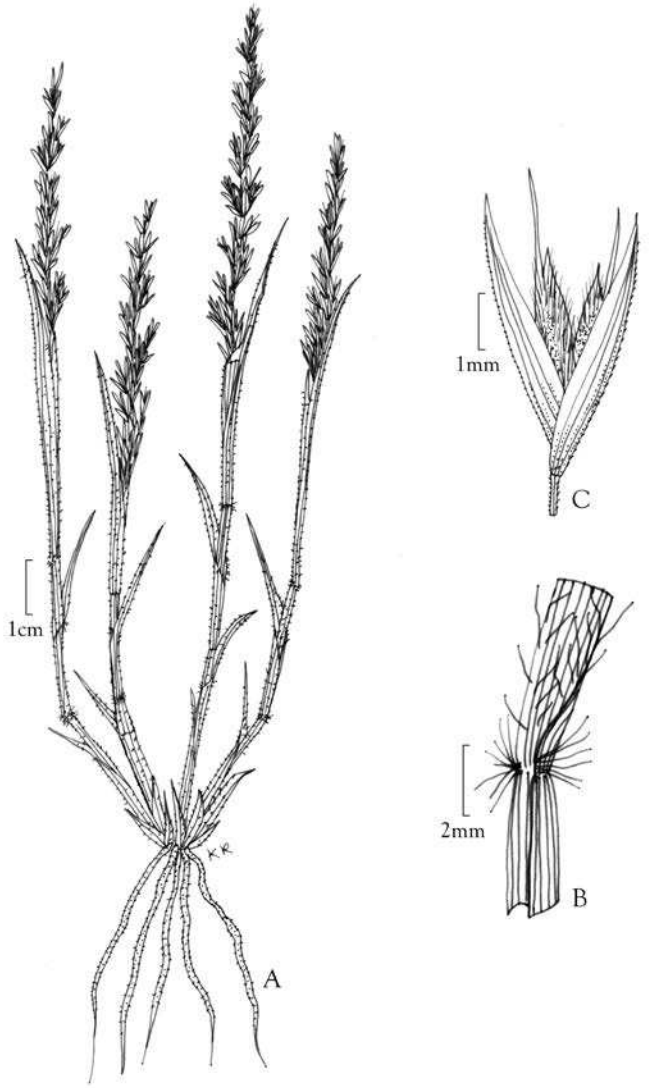


FIGURE 221. *Schismus arabicus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *T. Cope, G. Fahmy & I. El Garf 211* (CAI); B, C drawn from *G. Schweinfurth 1239* (US-806184).

213. *Schismus barbatus* (L.) Thell.

FIGURE 222

Schismus barbatus (L.) Thell., Bull. Herb. Boissier, sér. 2, 7(5): 391. 1907.

Common names: *abu hereida, abu mashi, bohma, zaghab el-far*; Arabian grass.

Caespitose annuals. Culms 3–20 cm tall, erect, geniculate or decumbent, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous;

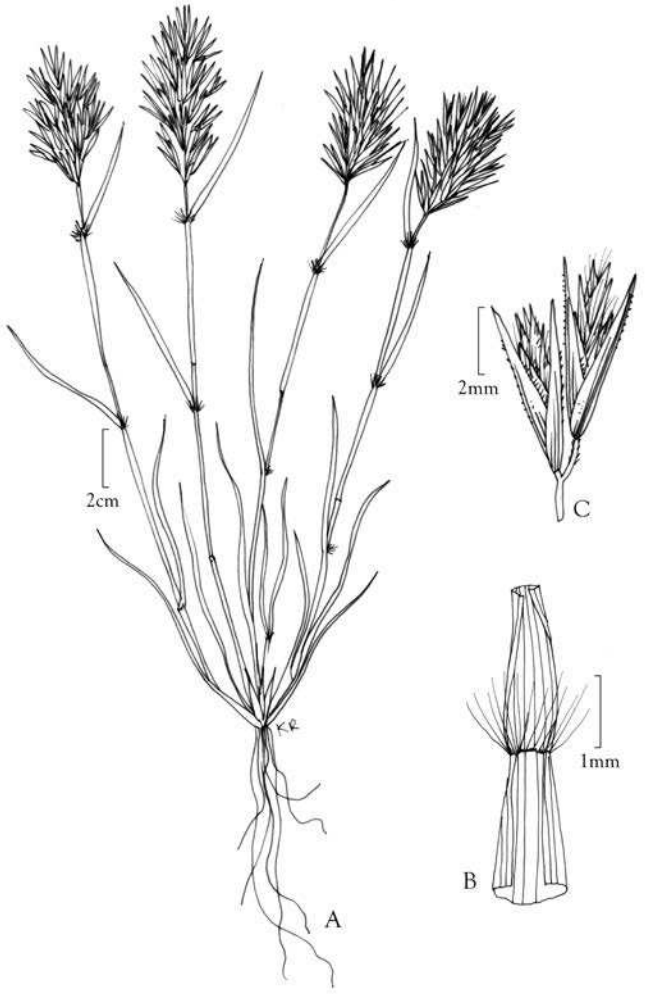


FIGURE 222. *Schismus barbatus*. A. Habit. B. Ligule, sheath, and blade. C. Two spikelets. A drawn from *A. Amer 10453* (CAI); B, C drawn from *J. P. Mandaville Jr. 417* (US-2473356).

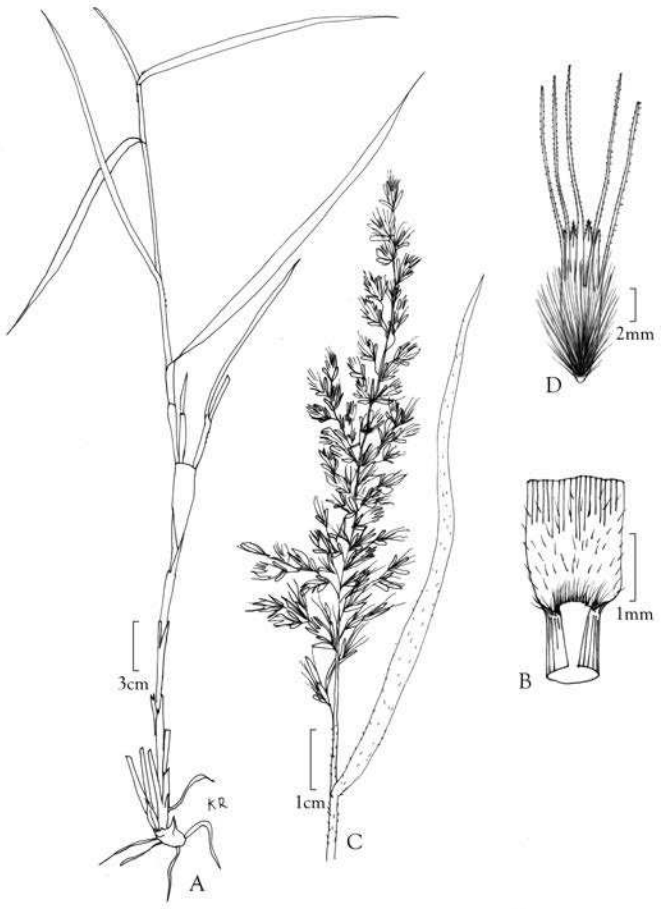


FIGURE 223. *Schmidtia pappophoroides*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *L. Smook 7070* (US-3199800).

oral hairs present; ligule a fringe of hairs; blades 1–10 cm long, 0.5–2 mm wide, filiform, convolute, ascending, sparsely hairy, margins scabrous, apex attenuate. Panicles 1–5 cm long, contracted, elliptic, or oblong. Spikelets 4–6 mm long, oblong, laterally compressed; lemmas 1.7–2.5 mm long, bilobed, mucronate between the lobes. Habitat: sandy soils. Distribution: (Mm, Ms, Nv, Dl, Dg, Dn, Di, Ol, S, Rz, Rq) Mediterranean, SW Asia, S and SW Africa.

214. *Schmidtia pappophoroides* Steud. ex J. A. Schmidt

FIGURE 223

Schmidtia pappophoroides Steud. ex J. A. Schmidt, Beitr. Fl. Cap Verd. Ins.: 145. 1852.

Caespitose perennials; stolons sometimes present; rhizomes short. Culms 10–90 cm tall, erect, geniculate or decumbent, pubescent with swollen bulb-like bases; butt sheaths glabrous. Leaves basal and cauline; sheaths pubescent with capitate hairs, viscid, ribbed, margins sparsely hairy; oral hairs present; ligule a fringe of hairs; blades 5–15 cm long, 2–5 mm wide, linear, conduplicate, ascending, hairy on both sides, viscid with capitate hairs, margins scabrous, apex attenuate. Panicles 6–12 cm long, 2–4.5 cm wide, open or contracted, oblong. Spikelets 10–15 mm long, laterally compressed; lemmas 8.5–14 mm long, 9-veined, coriaceous, 5-awned, principal awns 4.5–8 mm long, straight, bristly. Habitat: sandy areas. Distribution: (Ol) tropical and S Africa, Socotra, and Pakistan.

215. *Schoenefeldia gracilis* Kunth

FIGURE 224

Schoenefeldia gracilis Kunth, Révis. Gramin. 1: 283, pl. 53. 1830.

Caespitose annuals. Culms 20–80 cm tall, erect, geniculate or decumbent, weak; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 1–10 cm long, 2–3 mm wide, filiform, convolute, ascending, hairy on basal ⅓, margins scabrous, apex attenuate-filiform. Racemes 6–15 cm long, 1–4, digitate, curved, 1-sided, unilateral; rachis flattened. Spikelets 3–5 mm long, laterally compressed, cuneate; upper glume often mucronate; lemmas 1.5–2.5 mm long, 3-veined, awned, the awns 10–30(–40) mm long, flexuous, bristly. Habitat: sandy soils in desert grasslands. Distribution: (Nn) tropical Africa, Arabia to Pakistan, and India.

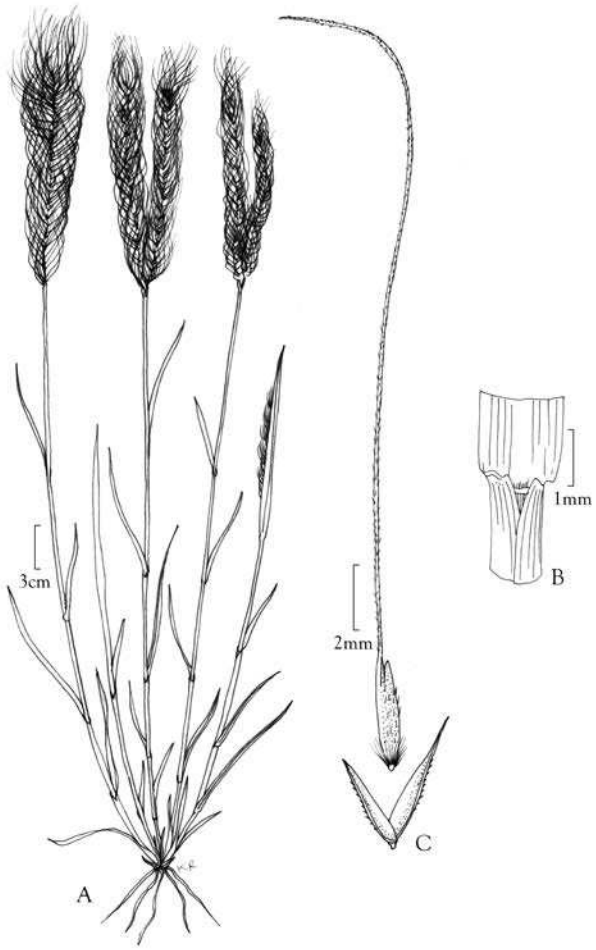


FIGURE 224. *Schoenefeldia gracilis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A modified from Cope (2005); B, C drawn from *W. Burger 3525* (US-2594202).

216. *Setaria geminata* (Forssk.) Veldkamp

FIGURE 225

Setaria geminata (Forssk.) Veldkamp, Blumea 39(1–2): 377. 1994. [*Paspalidium geminatum* (Forssk.) Stapf.]
Common names: *abu beid, niseela, qassab*; water paspalidium.

Mat-forming perennials; rhizomes elongated. Culms 10–150 cm long, spongy, prostrate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligule a fringe of hairs; blades 3–25 cm long, 1–3 mm wide, flat or filiform, wiry, spreading, stiff, ribbed, scabrous, margins smooth, bases cordate, apex acuminate, setaceous. Racemes 0.5–4 cm long, borne along a central axis 5–30 cm long, appressed, unilateral subtended by inflated leaf sheaths, embraced at base by subtending leaves. Spikelets 1.6–2.6 mm long, ovate, dorsally compressed;

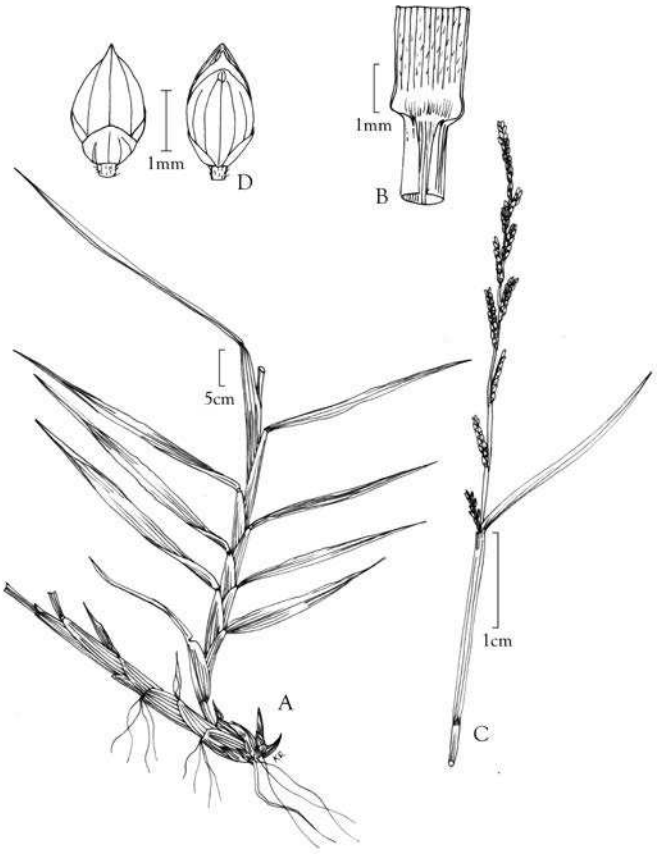


FIGURE 225. *Setaria geminata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A drawn from *M. Hassib s.n.* (CAI); B drawn from *A. Pappi 3209* (US-2686306); C drawn from *Abd El-Ghani 4109* (CAI); D modified from Allen (2003b).

lemmas awnless. Habitat: moist sites and a weed of cultivation. Distribution: (Mm, Nv, Di, Ol) Old World tropics.

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

FIGURE 226

*Setaria italica** (L.) P. Beauv., Ess. Agrostogr. 51, 170, 178. 1812. Common names: *shaar el far*; Italian foxtail millet, Italian millet.

Solitary annuals. Culms 30–80 cm tall, erect, geniculate; internodes glabrous, robust, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, ribbed, margins hairy; ligules 1–2 mm long, a fringe of hairs; blades 10–45 cm long, 6–20 mm wide, linear from a contracted base, spreading, flaccid, scaberulous, margins cartilaginous, apex attenuate. Panicles 5–30 cm long, 0.8–2.4 cm wide, spiciform, linear or oblong, continuous or interrupted, equilateral or nodding. Spikelets 2–3 mm long, elliptic, dorsally compressed, subsessile, each spikelet subtended by 1–3 bristles; bristles up to 13 mm long; lemma awnless. Habitat: cultivated fields, occasionally cultivated as a cereal. Distribution: (Nv) warm temperate Old World.

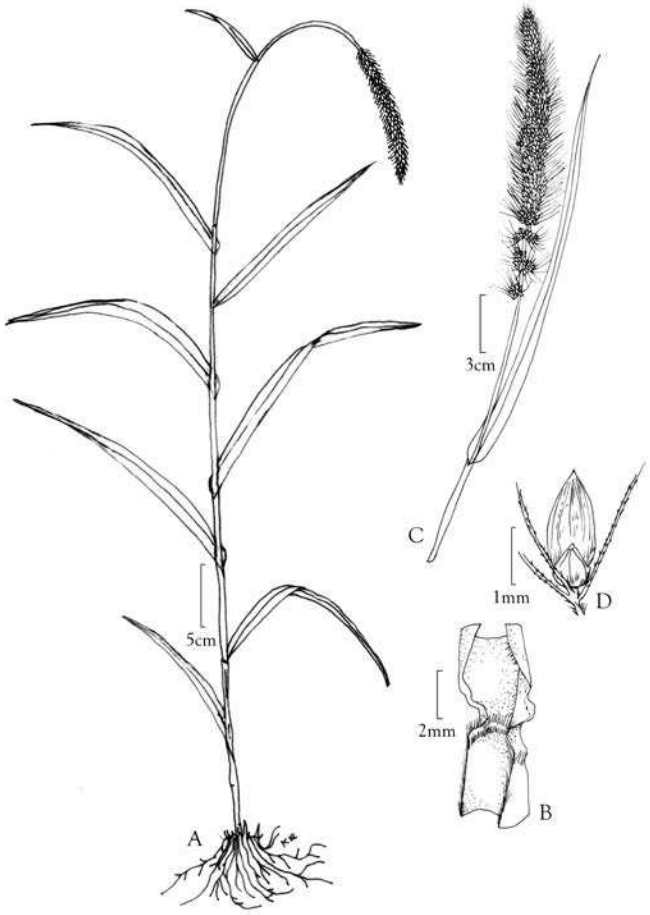


FIGURE 226. *Setaria italica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C drawn from *F. R. Fosberg 36170* (US-2669792); D: modified from Rominger (2003).

218. *Setaria megaphylla* (Steud.) T. Durand & Schinz

FIGURE 227

Setaria megaphylla (Steud.) T. Durand & Schinz, Consp. Fl. Afr. 5: 773. 1894.

Caespitose perennials. Culms up to 150 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, margins smooth; ligule a fringe of hairs; blades 15–20 cm long, 1–10 mm wide,

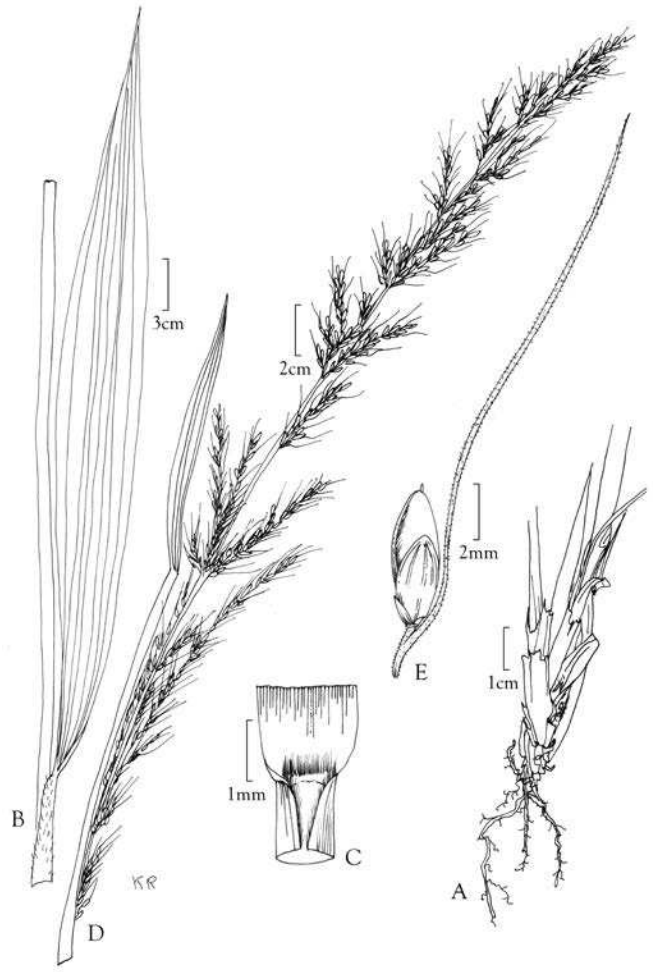


FIGURE 227. *Setaria megaphylla.* A. Basal part of culm. B. Leaf. C. Ligule, sheath, and blade. D. Inflorescence. E. Spikelet. A drawn from *V. Täckholm & I. El Sayed s.n.* (CAI); B, D modified from Ibrahim and Kabuye (1988); C, E drawn from *R. A. M. Geeteraus 5306* (US-2382374).

linear-lanceolate, conspicuously pleated, spreading, flaccid, scabrous, margins scabrous, bases tapering, apex acuminate. Panicles 20–60 cm long, open, linear or lanceolate. Spikelets 2.2–3(–3.5) mm long, elliptic or ovate, dorsally compressed, sessile, acute, each spikelet subtended by bristles; lemma awnless. Habitat: cultivated ornamental grass and margins of forests. Distribution: (Nn and Nv) tropical and S Africa, tropical America.

219. *Setaria obtusifolia* (Delile) Morrone

FIGURE 228

Setaria obtusifolia (Delile) Morrone, Syst. Bot. Monogr. 96: 85–86, f. 11. 2014. [*Paspalidium obtusifolium* (Delile) D. Simpson.]

Mat-forming perennials; rhizomes elongated. Culms 30–60 cm long, prostrate, glabrous; lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins smooth; ligules 0.5–1 mm long, a fringe of hairs; blades 3–15 cm long, 2–10 mm wide, linear, flat or conduplicate, spreading, glabrous, margins smooth, bases narrow, apex broadly obtuse to acute. Racemes 1–3 cm long, borne along a flattened central axis 10–30 cm long, unilateral. Spikelets 3–4 mm long, ovate, dorsally compressed; lemmas awnless. Habitat: moist sites and irrigation ditches. Distribution: (Mm, Nv) tropical and S Africa, Algeria.

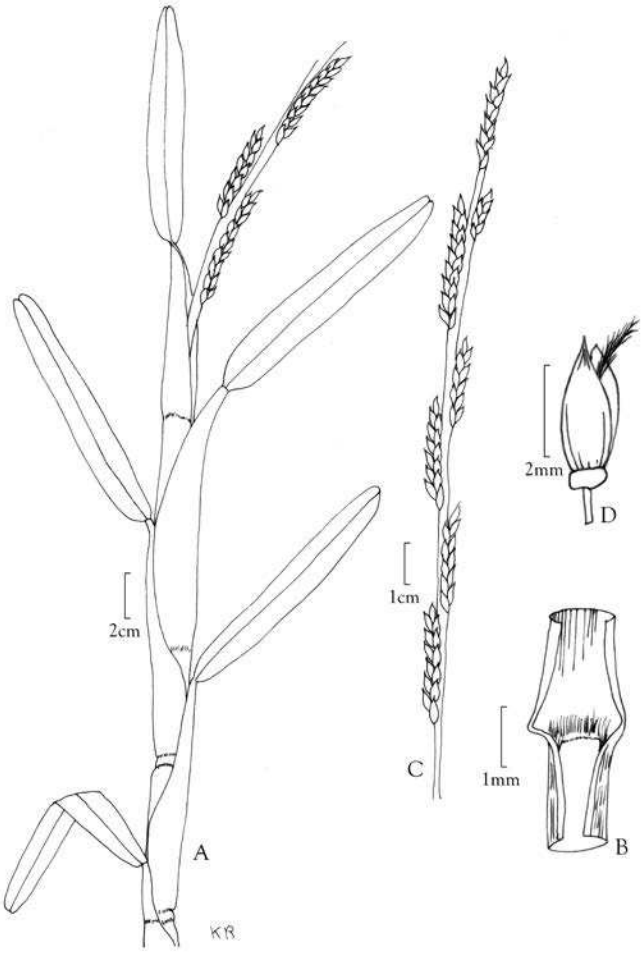


FIGURE 228. *Setaria obtusifolia.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet with upper glume. A, C, D modified from Ibrahim and Kabuye (1988); B drawn from *Smook & G. Russell 1943* (US-3193057).

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

FIGURE 229

Setaria pumila (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817. Common names: *deil el far, deil el qott, safwa*; yellow foxtail grass.

Solitary annuals. Culms up to 130 cm tall, erect, geniculate, robust, ribbed; nodes dark, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins

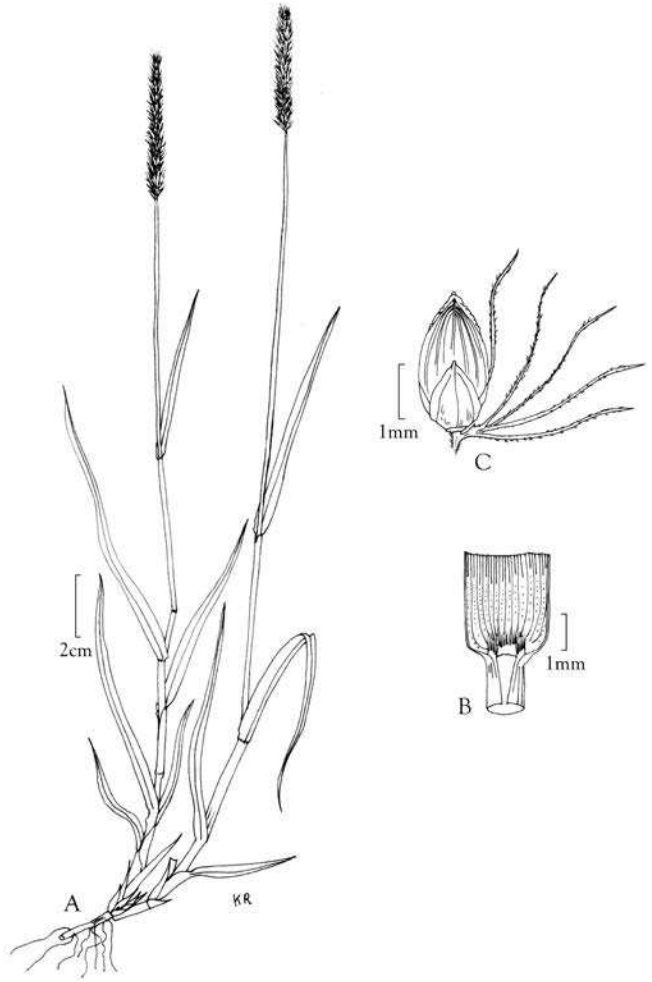


FIGURE 229. *Setaria pumila.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. Kanal 753* (US-3268326); C modified from Rominger (2003).

membranous; collars dark; ligules 1–2 mm long, ciliolate membranes or a fringe of hairs; blades 2–30 cm long, 2–5(–10) mm wide, linear-lanceolate, loosely twisted, spreading, flaccid, surfaces glabrous, margins scabrous, apex acute. Panicles 1–10 (–20) cm long, spiciform, terminal, linear, ovate, gibbous. Spikelets 1.5–3.5 mm long, pediceled, dorsally compressed, each spikelet subtended by 4–12 bristles; bristles 3–8 mm long, antrorsely scabrous; lemmas awnless. Habitat: roadsides and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Ol, S) tropical and warm temperate Old World.

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

FIGURE 230

Setaria verticillata (L.) P. Beauv., Ess. Agrostogr. 51, 171, 178. 1812.

Common names: *difra, deil el qot, no'eima, no'eym, qamh el far*; bristly foxtail, foxtail.

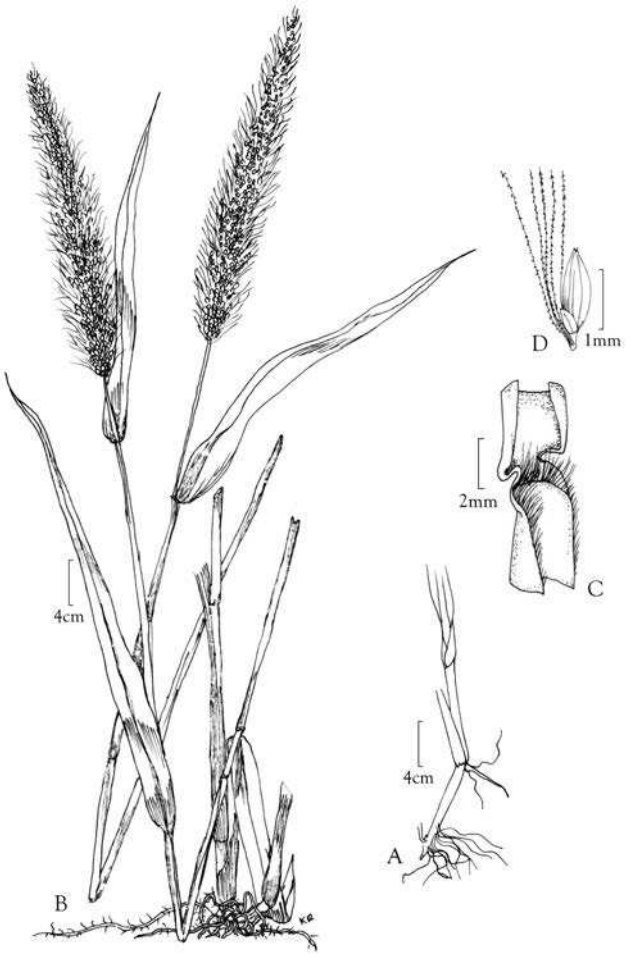


FIGURE 230. *Setaria verticillata*. A. Basal culm. B. Habit. C. Ligule, sheath, and blade. D. Spikelet. A modified from Ibrahim and Kabuye (1988); B–D drawn from *L. F. Ward s.n.* (US-825057).

Caespitose annuals. Culms 30–100 cm tall, erect, geniculate; internodes glabrous, robust, ribbed; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, sparsely hairy, ribbed, margins hairy; ligule a ciliolate membrane; blades 3–30 cm long, 4–10(–15) mm wide, linear, spreading, flaccid, scabrous, margins scabrous, apex acute. Panicles 2–15 cm long, 0.5–1.5 cm wide, spiciform, linear, continuous or interrupted. Spikelets 1.5–2.5 mm long, elliptic, dorsally compressed, pediceled, each spikelet subtended by a solitary bristle; bristles 4–7 mm long; lemmas awnless. Habitat: a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Da, Di, Ol, S, Ra, Ge) temperate and warm temperate regions of the Old World.

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

FIGURE 231

Setaria viridis (L.) P. Beauv., Ess. Agrostogr. 51, 171, 178. 1812.

Common names: *deil el far*; green bristlegrass, green foxtail.

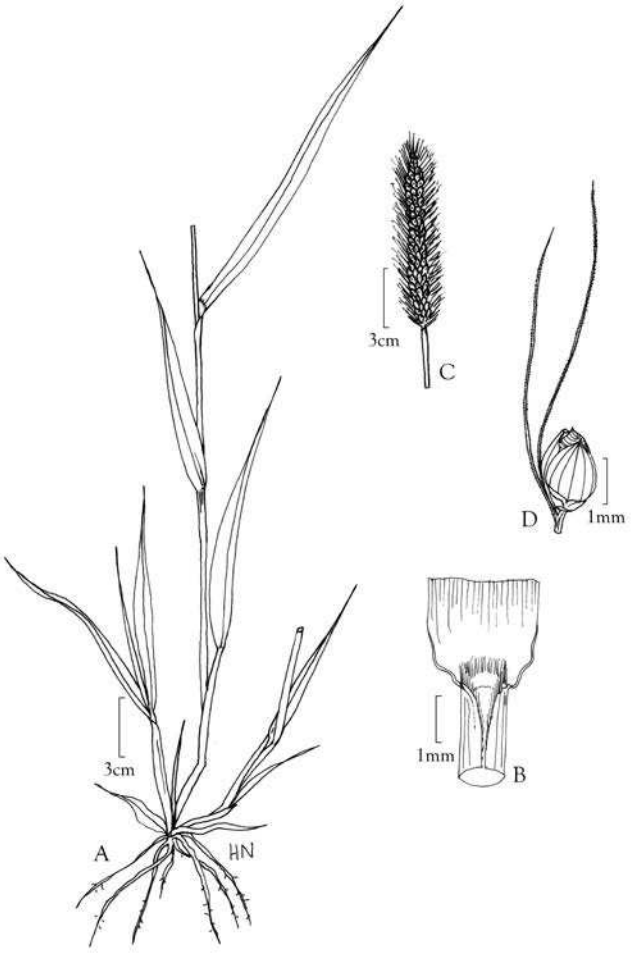


FIGURE 231. *Setaria viridis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *R. Kanal 764* (US-3268329).

Caespitose annuals. Culms 10–100 cm tall, erect or geniculate; internodes glabrous, ribbed; butt sheaths glabrous. Leaves mostly cauline; sheaths glabrous, ribbed, margins hairy; ligules 1–2 mm long, a fringe of hairs; blades 3–30 cm long, 3–7 mm wide, linear-lanceolate, spreading, flaccid, scaberulous, margins scabrous, apex acute. Panicles 1–10 cm long, 0.4–1 cm wide, spiciform, linear. Spikelets 1.8–3 mm long, elliptic, dorsally compressed, obtuse, each spikelet subtended by 1–3 bristles; bristles 5–10 mm long, antrorsely scabrous; lemma awnless. Habitat: a weed of cultivation. Distribution: (Ms, Nv, Nn, Di, Ol, S) temperate Old World.

223. *Sorghum arundinaceum* (Desv.) Stapf

FIGURE 232

Sorghum arundinaceum (Desv.) Stapf, Fl. Trop. Afr. 9: 114. 1917.

Common name: Sudan grass.

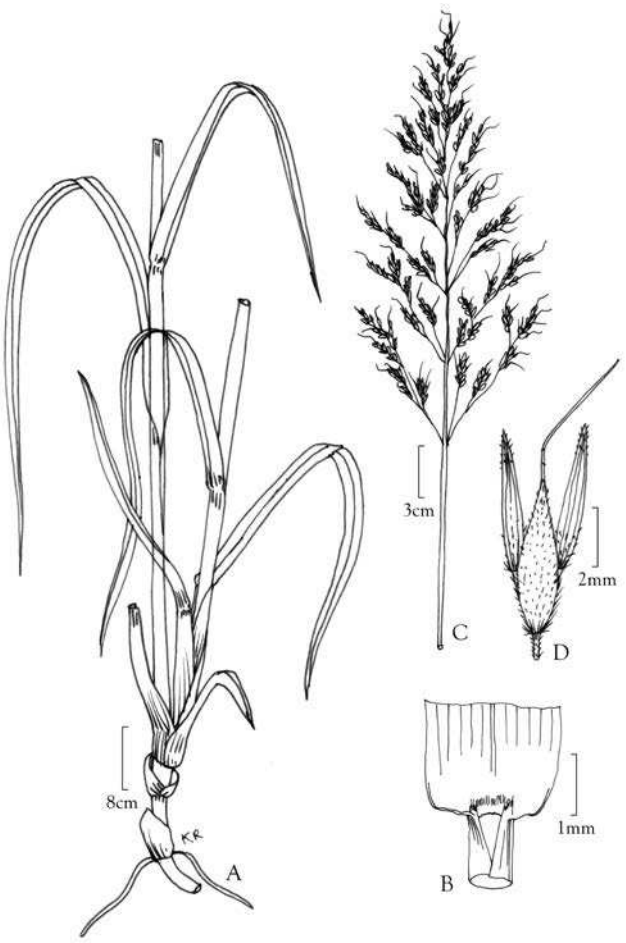


FIGURE 232. *Sorghum arundinaceum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *Ndegwa 502* (US-3066978), *M. Myre* (US-2151002).

Solitary annuals or short-lived perennials. Culms up to 400 cm tall, erect, robust, geniculate; internodes glabrous, often lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; ligules 2–3 mm long, a ciliate membrane; blades 5–70 cm long, 0.5–6 cm wide, linear, spreading, hairy on the basal ⅓, margins scabrous, bases cordate, apex attenuate. Panicles 10–60 cm long, open, linear or lanceolate or ovate; primary branches (rames) not whorled; rames 0.8–2 cm long, bearing 2–7 fertile spikelets. Fertile spikelets 4–9 mm long, lanceolate to ovate, dorsally compressed, acute; pediceled spikelets staminate or sterile; lemmas awnless. Habitat: swampy sites, streamsides, and disturbed sites usually in dark soils. Distribution: (Nv?, Nn?) Africa to India and Australia.

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

FIGURE 233

*Sorghum bicolor** (L.) Moench, Methodus 207. 1794.

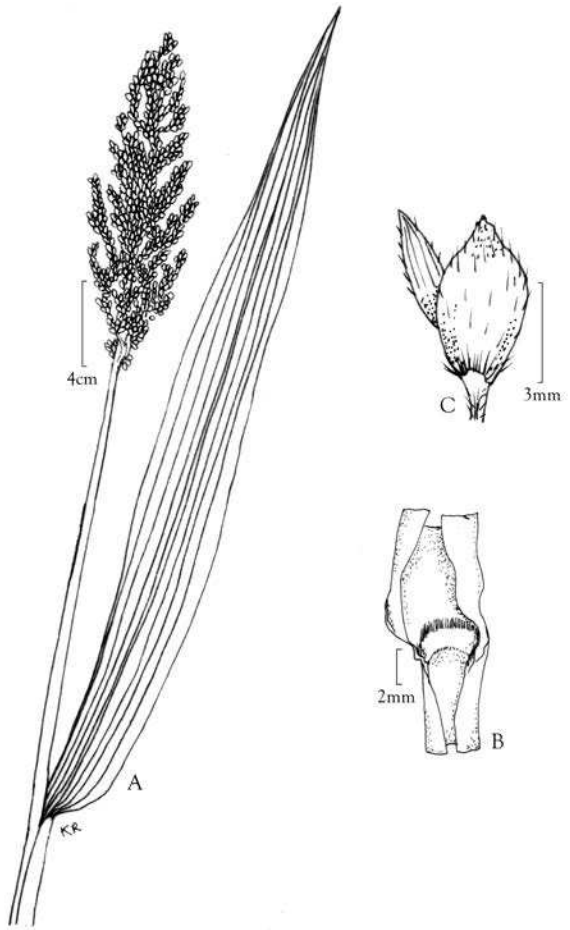


FIGURE 233. *Sorghum bicolor.* A. Leaf and inflorescence. B. Ligule, sheath, and blade. C. Spikelet pedicellate (left) and sessile (right). A, B drawn from *L. H. Dewey 161* (US-431586); C modified from Barkworth (2003b).

Common names: *dourayit, dura hamra, dura helwa, dura rafia'aa, dura siefi, durra siefi*; milo, sorghum.

Caespitose annuals or short-lived perennials. Culms up to 250 cm tall, erect, robust, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; oral hairs present; ligules 2–3 mm long, a ciliate membrane; blades 30–70 cm long, 0.5–7 cm wide, linear-lanceolate; spreading, glabrous, margins scabrous, bases cordate, apex acuminate. Panicles 4–50 cm long, 2–20 cm wide, open or contracted, lanceolate or ovate or globose, equilateral, or nodding, spreading; rames bearing few fertile spikelets. Fertile spikelets 3–10 mm long, in pairs, oblong or ovate or obovate or orbicular, dorsally compressed; pediceled spikelets staminate or sterile; lemmas unawned or awned, awns 3–10(–30) mm long, geniculate, column twisted, pubescent. Habitat: a cultivated cereal and a weed of cultivation. Distribution: (Mm, Ms, Nv, Nn, Ol) tropical Old World.

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

FIGURE 234

Sorghum halepense (L.) Pers., Syn Pl. 1: 101. 1805.
Common names: *garawa, hashish el faras, hashish el Sudan*; Johnson grass.

Solitary perennials; rhizomes more than 2 cm long, elongated, scaly. Culms up to 50–200 cm tall, 0.4–2 cm think, erect, or geniculately ascending or decumbent; internodes glabrous to pubescent; nodes bearded, sometimes rooting below; butt sheaths glabrous. Leaves cauline; sheaths glabrous, ribbed, margins smooth; ligules 2–3 mm long, a ciliate membrane; blades 20–70 cm long, 5–40 mm wide, scabrous, margins scabrous, bases cordate, apex acute. Panicles 10–55 cm long, 3–25 cm wide, open, lanceolate or pyramidal; branches (rames) 1.2–2.5 cm long, bearing 1–5 spikelet pairs. Spikelets 4.5–5(–5.5) mm long, sessile, elliptic, dorsally compressed; lemmas unawned or with awns 10–16 mm long from a sinus, geniculate, twisted below, column pubescent or hairy. Habitat: cultivated as fodder, a weed of cultivation, moist disturbed sites. Distribution: (Mm, Ms, Nv, Nn, Ol) Mediterranean to India.

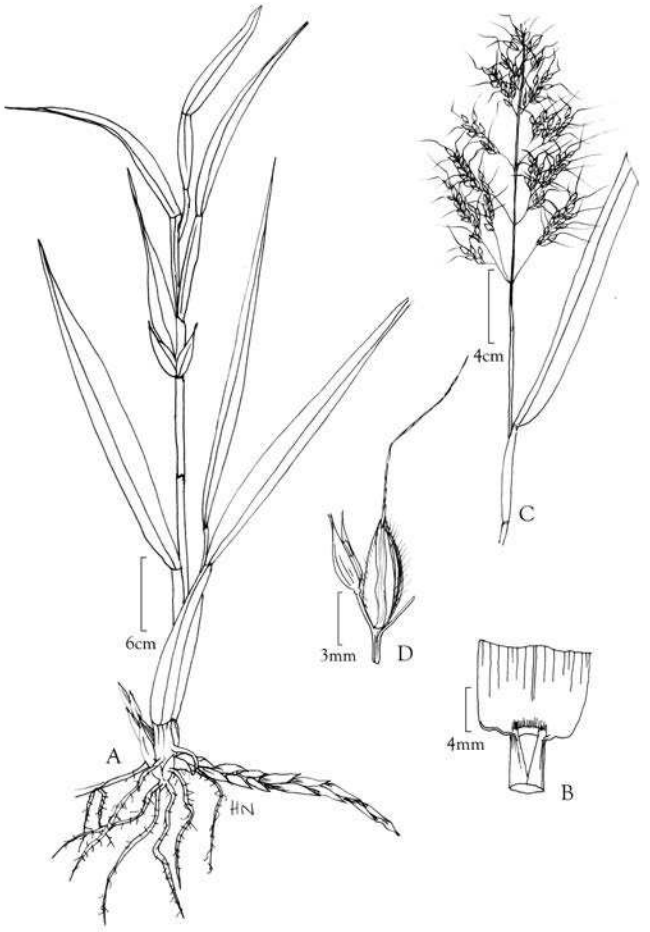


FIGURE 234. *Sorghum halepense*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets, pedicellate (left) and sessile (right). A–C drawn from *P. Fleming 616* (US-3117621, 3117622); D modified from Barkworth (2003b).

226. *Sorghum virgatum* (Hack.) Stapf

FIGURE 235

Sorghum virgatum (Hack.) Stapf, Fl. Trop. Afr. 9: 111. 1917.
Common names: *garawa*, *hasheesh el faras*.

Solitary annuals. Culms 50–100 cm tall, erect; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves cauline; sheaths glabrous, ribbed, margins smooth; collars dark; ligules 2–3 mm long, membranous, apex acute or lacerate; blades 10–40 cm long, 3–6 mm wide, linear, conduplicate, spreading, flaccid, glabrous, margins scabrous, apex acute. Panicles 15–60 cm long, open, lanceolate. Spikelets 6.5–7 mm long, lanceolate, dorsally compressed, acute; rames 1–4 cm long, bearing 3–7 fertile spikelets; principal lemma awns 8–16 mm long, geniculate, column twisted. Habitat: moist places and margins of cultivation. Distribution: (Mm, Ms, Nv, Nn, Di, Ol, S) tropical W Africa to Sudan.

227. *Sorghum* × *drummondii** (Nees ex Steud.) Millsp. & Chase

FIGURE 236

Sorghum × *drummondii** (Nees ex Steud.) Millsp. & Chase, Publ. Field Columb. Mus., Bot. Ser., 3(1): 21. 1903. [*Sorghum bicolor* × *Sorghum arundinaceum*.]

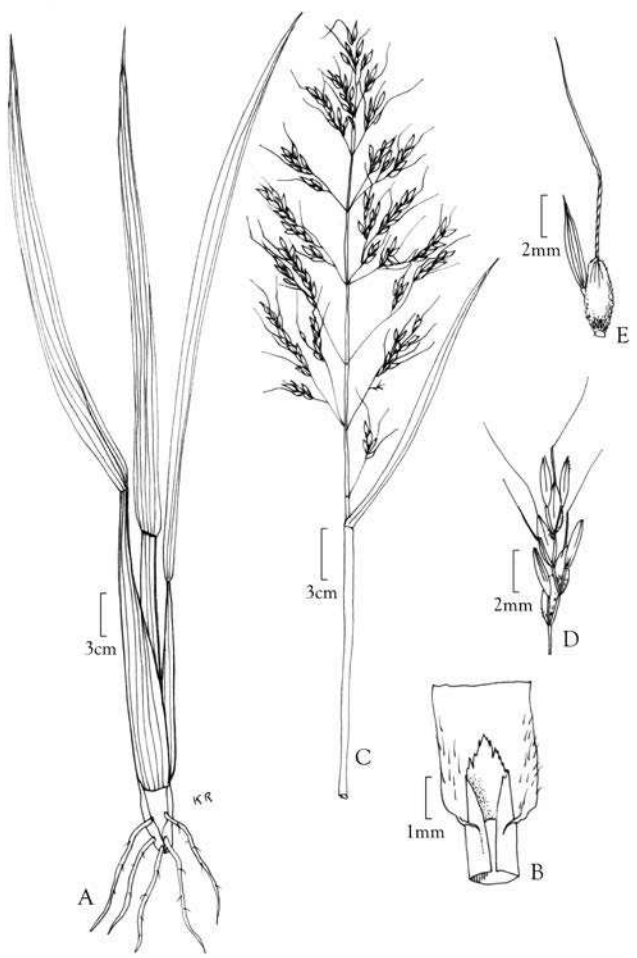


FIGURE 235. *Sorghum virgatum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Inflorescence branch. E. Spikelet. A drawn from *N. El Hadidi s.n.* (CAI); B drawn from *G. Schweinfurth 68* (US-1259677); C–E drawn from *A. Bakry 2843* (CAI).

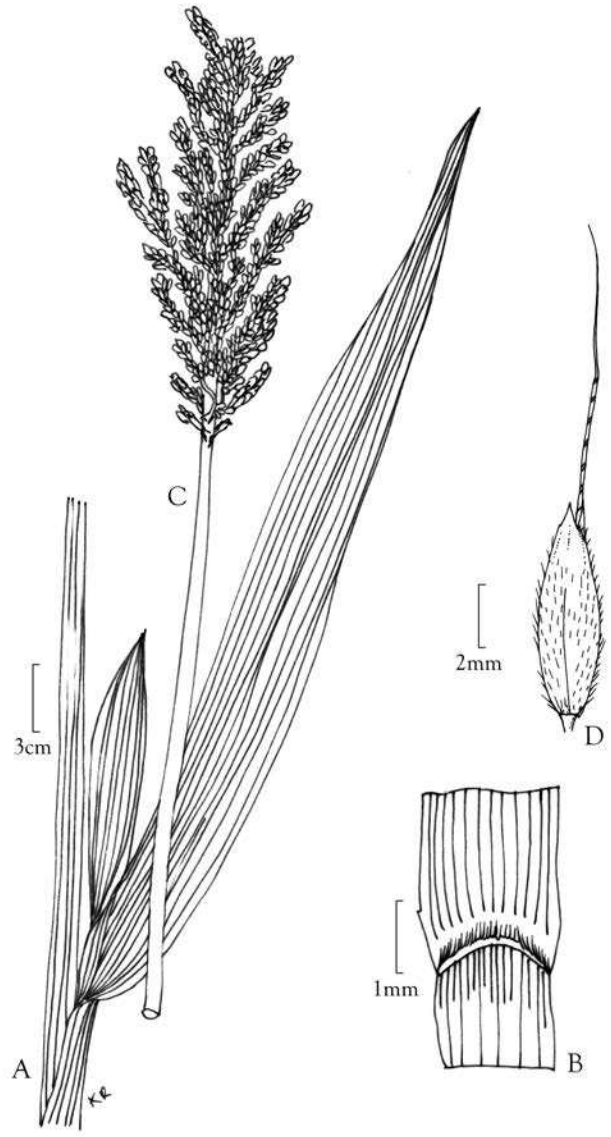


FIGURE 236. *Sorghum* × *drummondii.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm s.n.*(CAI); B–D drawn from *H. L. Shantz 946* (US-1298217).

Common names: *danabi, dura baladi, dura beida, dura ewiega, dura safra, dura siefi, hamra*.

Solitary annuals. Culms up to 400 cm tall, robust or decumbent; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; ligules 2–3 mm long, a ciliate membrane; blades 5–70 cm long, 5–60 mm wide, lanceolate, spreading, hairy on the basal ⅓, margins scabrous, bases cordate, apex acuminate. Panicles 15–30 cm long, 8–15 cm wide, open, ovate or pyramidal; rames 1.5–2.5 cm long, bearing few fertile spikelets. Spikelets 6–7.5 mm long, 2–3 mm wide, elliptic, dorsally compressed, subacute; principal lemma awns 10–16 mm long, geniculate, column twisted. Habitat: cultivated as forage. Distribution: (Mm, Mp, Nv, Nn, Ol, S) tropics Old World.

228. *Sphenopus divaricatus* (Gouan) Rchb.

FIGURE 237

Sphenopus divaricatus (Gouan) Rchb., Fl. Germ. Excurs. 45. 1830.

Common name: *indinqirni*.

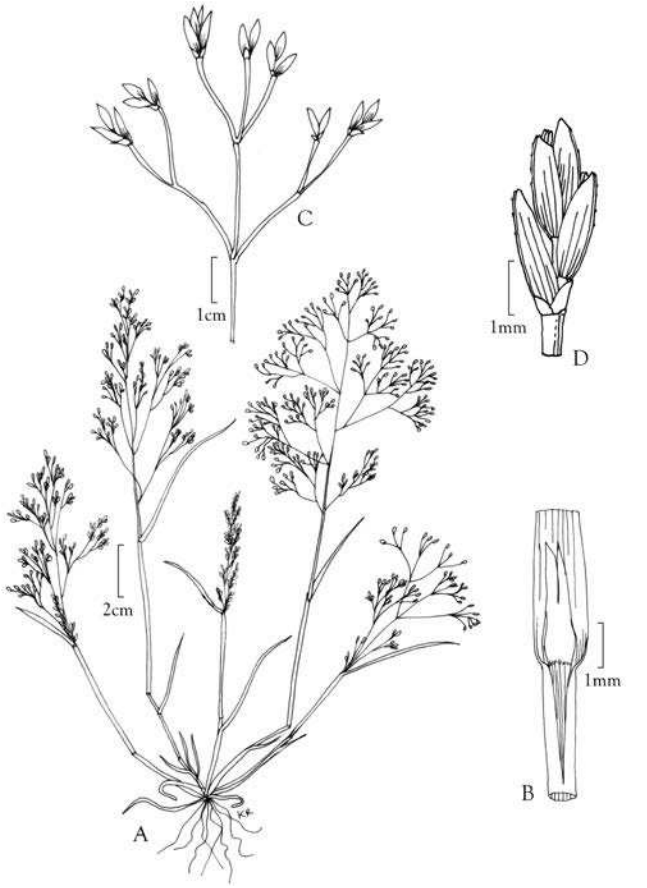


FIGURE 237. *Sphenopus divaricatus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A, C drawn from *H. Hosni s.n.* (CAI); B, D drawn from *T. R. Sodersrom 1475* (US-2915766), *O. J. Salmeer s.n.* (US-2970954).

Solitary, delicate annuals. Culms 10–30 cm tall, erect, geniculate; internodes glabrous, delicate, purplish; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths much longer than blades, glabrous, margins membranous; ligules 2–3 mm long, membranous, decurrent, apex acute; blades 5–7 cm long, 0.5–1.5 mm wide, filiform, convolute, spreading, ascending, glabrous, margins scabrous, bases narrow, apex attenuate. Panicles 2–10 cm long, open, ovate. Spikelets 2–3 mm long, 2–3(–5)-flowered, elliptic, laterally compressed; lemmas 1.2–1.6 mm long, awnless. Habitat: sandy soils on alluvial slopes. Distribution: (Mm, Ms, Nv, Ol, On, Di) Mediterranean to C Asia.

229. *Sporobolus aculeatus* (L.) P. M. Peterson

FIGURE 238

Sporobolus aculeatus (L.) P. M. Peterson, Taxon 63(6): 1234. 2014 [*Crypsis aculeata* (L.) Aiton].

Common name: prickle grass.

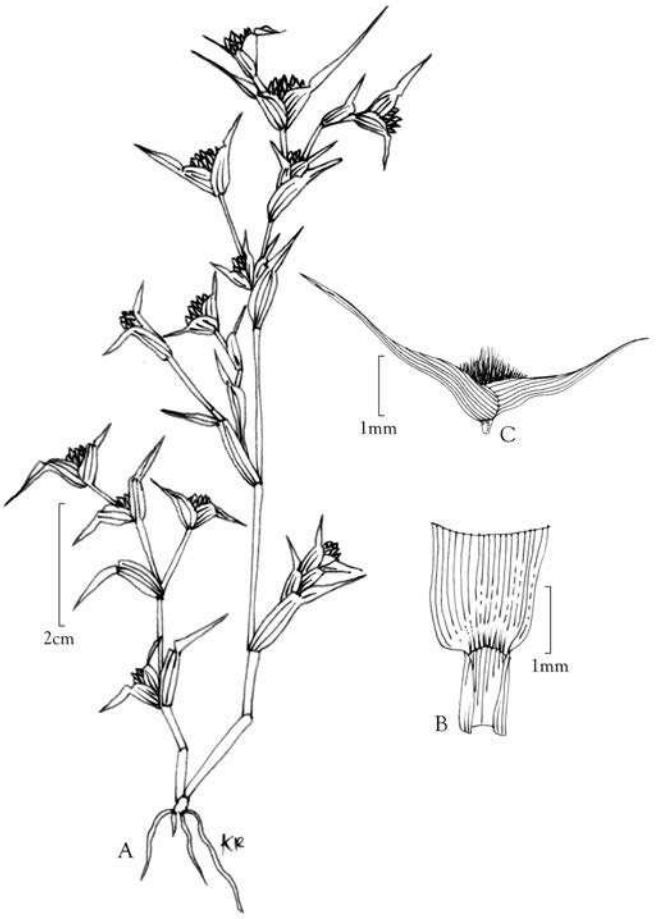


FIGURE 238. *Sporobolus aculeatus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence enclosed in two sheathless bladesSpikelet. A drawn from *H. Lamer s.n.* (CAI); B, C drawn from *G. Schweinfurth 472* (US-821382).

Caespitose annuals. Culms 5–35 cm tall, erect, geniculate or prostrate, branches ample; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, the uppermost strongly compressed, ribbed, glabrous, margins membranous; oral hair ciliate; ligules 1–2 mm long, a fringe of hairs; blades 2–5 cm long, 2–3.5 mm wide, lanceolate, flat or involute, stiff, firm, pilose, hairy on upper and lower surfaces, margins scabrous, apex acuminate. Panicles 0.5–1 cm long, capitate, corymbose, ellipsoid or ovoid, subtended by 2 sheathless blades. Spikelets 3–4.5 mm long, 1-flowered, elliptic, laterally compressed; glumes shorter than the lemmas; lemmas 3.5–4.5 mm long, awnless. Habitat: weed of cultivation and disturbed sites. Distribution: (Mm, Nv) Mediterranean region to E Asia.

230. *Sporobolus alopecuroides* (Piller & Mitterp.) P. M. Peterson

FIGURE 239

Sporobolus alopecuroides (Piller & Mitterp.) P. M. Peterson, Taxon 63(6): 1234. 2014. [*Crypsis alopecuroides* (Piller & Mitterp.) Schrad.]

Common name: foxtail prickle grass.

Mat-forming annuals. Culms 5–30 cm tall, branches ample, green or glaucous, decumbent or prostrate; internodes striate, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths strongly compressed, ribbed, hairy, margins smooth; ligule a fringe of hairs; blades 5–10 cm long, 1–3 mm wide, glaucous, linear, flat or revolute, pubescent to sparsely hairy, midribs conspicuous above, margins scabrous, apex acuminate. Panicles 0.5–7.5 cm long, 0.3–0.6 cm wide, spiciform, linear, erect, terminal, partially included in leaf sheaths. Spikelets 2–2.5 mm long, 1-flowered, elliptic, laterally compressed; lemmas 2–2.5 mm long, awnless. Habitat: weed of cultivation and roadsides. Distribution: (Nv, Di) Mediterranean to C Asia.

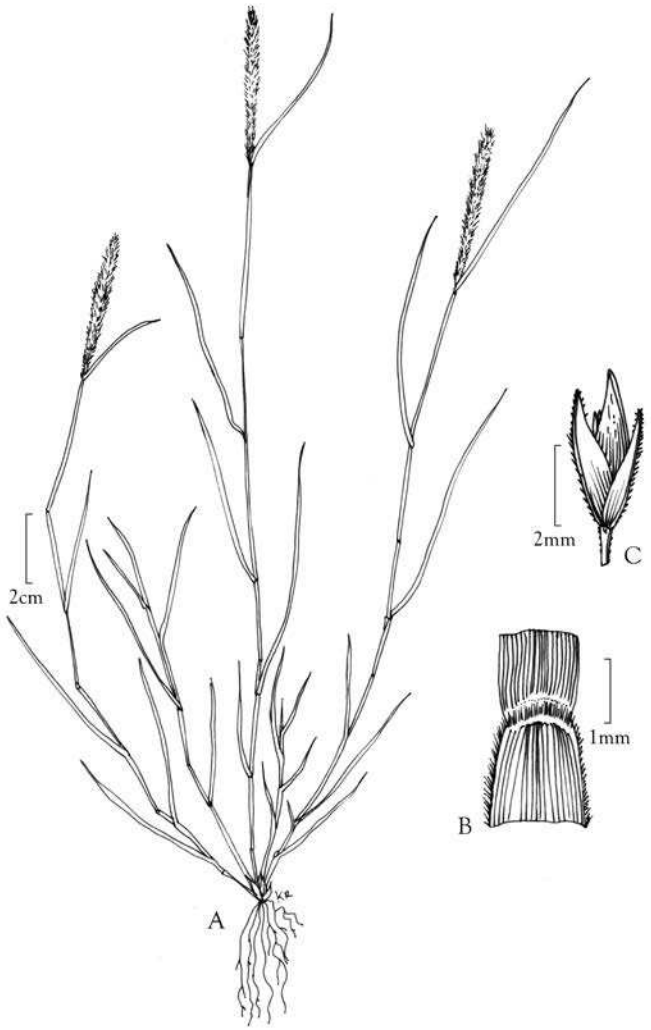


FIGURE 239. *Sporobolus alopecuroides*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *N. Vyhodeevski 406* (CAI); B, C drawn from *L. Richer* (US-996159).

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

FIGURE 240

Sporobolus ioclados (Nees ex Trin.) Nees, Fl. Afr. Austral. Ill. 1:161. 1841.

Common name: pan dropseed.

Caespitose perennials; stolons sometimes present. Culms 10–80 cm tall, erect, geniculate; internodes glabrous, striped; nodes

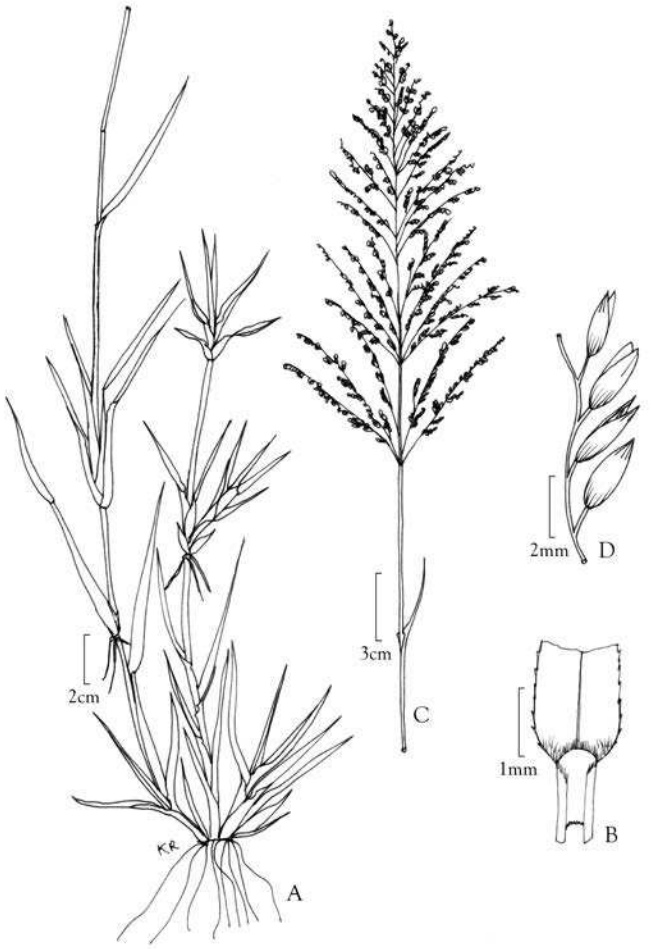


FIGURE 240. *Sporobolus ioclados*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Inflorescence branch with four spikelets. A, C drawn from *Migahid & Sheikh 429-A* (CAI); B, D drawn from *J. Ash* (US-2837164).

dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, glabrous, margins membranous; oral hairs present; ligule a fringe of hairs; blades 2–20 cm long, 1–3 mm wide, flat or convolute, straight, ascending, scabrous, margins cartilaginous, bases narrow, apex acuminate. Panicles 3–20 cm long, open to somewhat contracted, pyramidal. Spikelets 1.5–3(–3.3) mm long, 1-flowered, lanceolate, subterete; lemmas 1.5–3 mm long, awnless. Habitat: rocky slopes and wadis. Distribution: (Ge?, Da?, Dg?, Dl?, Dn?) tropical Africa, Arabia to India.

232. *Sporobolus natalensis* (Steud.) T. Durand & Schinz

FIGURE 241

Sporobolus natalensis (Steud.) T. Durand & Schinz, Consp. Fl. Afr. 5: 822. 1895.
Common name: giant rat's tail grass.

Caespitose perennials. Culms up to 100 cm tall, erect, geniculate; internodes glabrous, striped; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, surfaces glabrous, margins scabrous; oral hairs present; ligule a fringe of hairs; blades 20–50 cm long, 1–3 mm wide, flat or convolute, flaccid, ascending, hairy on the basal ⅓, margins pubescent, bases narrow, apex filiform, attenuate. Panicles 20–30 cm long, narrowly triangular, somewhat contracted, partially included in the leaf sheath. Spikelets 1.6–2.3 mm long, 1-flowered, lanceolate, subterete; lemmas 1.6–2.3 mm long, awnless. Habitat: damp sandy and rocky sites, introduced. Distribution: (Mm) tropical and S Africa, Arabia.

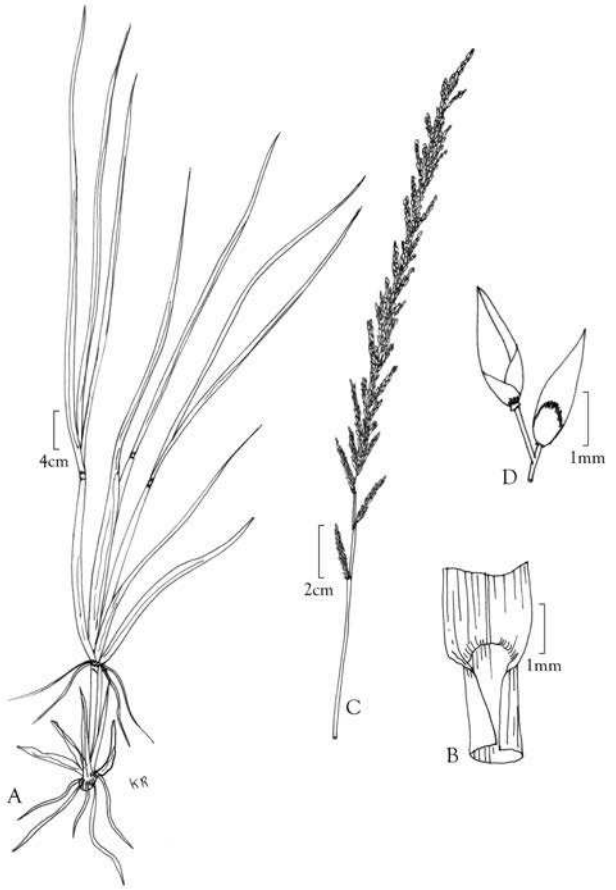


FIGURE 241. *Sporobolus natalensis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Two spikelets. A–D drawn from *Reading Univ. 103* (K-H2011/01927).

233. *Sporobolus niliacus* (Bornm.) P. M. Peterson

FIGURE 242

Sporobolus niliacus (Bornm.) P. M. Peterson, Taxon 63(6): 1234. 2014. [*Crypsis vaginiflora* (Forssk.) Opiz.]
Common name: modest prickle grass.

Mat-forming annuals. Culms 10–35 cm tall, decumbent or prostrate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, ribbed, the



FIGURE 242. *Sporobolus niliacus*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence enclosed by two leaves. A drawn from *L. Boulos s.n.* (CAI); B, C drawn from *P. J. Greenway 5804* (US-1815406).

upper strongly compressed, keeled, glaucous, margins hairy; collars pilose; ligules 1–2 mm long, a fringe of hairs; blades 2–5 cm long, 2–3.5 mm wide, deciduous at the ligules, lanceolate, flat or convolute, stiff, firm, sparsely hairy, margins scabrous, bases cordate, apex acuminate. Panicles 0.3–1.5 cm long, capitate, ovate or ellipsoid, subtended by an inflated leaf sheath (spatheoles). Spikelets 2.5–3.2 mm long, 1-flowered, elliptic, laterally compressed; lemmas 2.5–3.2 mm long, awnless. Habitat: moist places. Distribution: (Nv, Nn, Dl, Dg) tropical Africa to India.

234. *Sporobolus pungens* (Schreb.) Kunth

FIGURE 243

Sporobolus pungens (Schreb.) Kunth, Révis. Gramin. 1:68. 1829.

Mat-forming perennials; rhizomes elongated. Culms 10–30 cm tall, erect, geniculate, glabrous; butt sheaths glabrous.

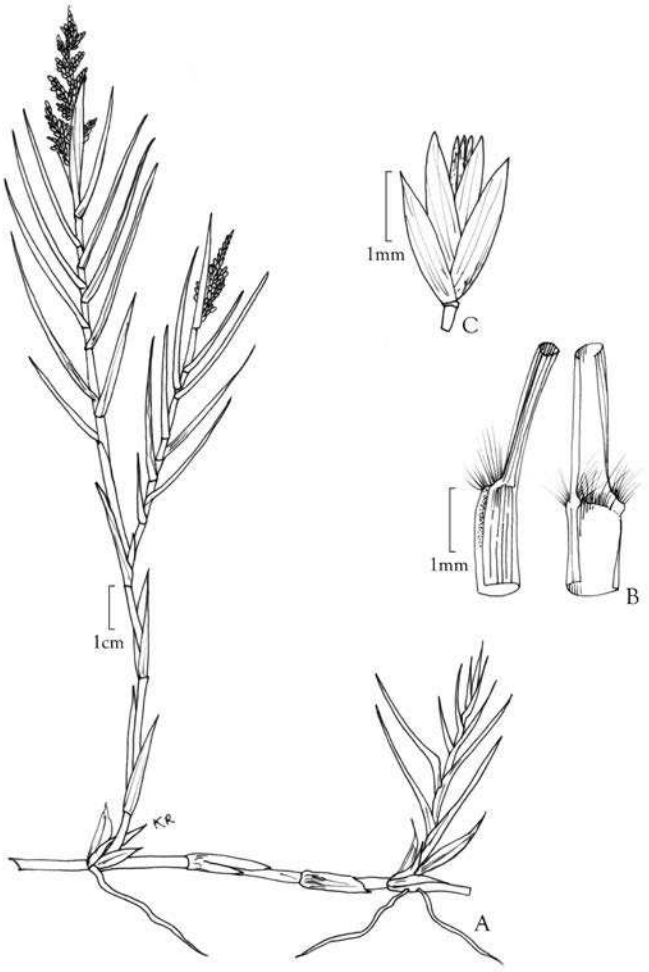


FIGURE 243. *Sporobolus pungens.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Imam s.n.* (CAI); B, C drawn from *J. Pitard s.n.* (US-1130127).

Leaves basal and cauline, conspicuously distichous; sheaths ribbed, glabrous; margins smooth; ligule a fringe of hairs; blades 2–8 cm long, 1–4 mm wide, linear, involute, straight, ascending, hairy on basal ⅓, margins pubescent, bases narrow, apex spiny pungent. Panicles 3–6 cm long, contracted, ovate. Spikelets 1.5–2.5 mm long, 1-flowered, lanceolate, subterete; lemmas 1.5–2.5 mm long, awnless. Habitat: seashore, sandy areas, and salt marshes. Distribution: (Mm, Ms, Nv, Di, S) Mediterranean region.

235. *Sporobolus schoenoides* (L.) P. M. Peterson

FIGURE 244

Sporobolus schoenoides (L.) P. M. Peterson, Taxon 63(6): 1234. 2014. [*Crypsis schoenoides* (L.) Lam.]

Common names: *babaaq, hosaad*; cowpond grass, swamp prickle grass, swamp timothy.

Mat-forming annuals. Culms 5–35 cm tall, glaucous, decumbent or prostrate; internodes glabrous; butt sheaths

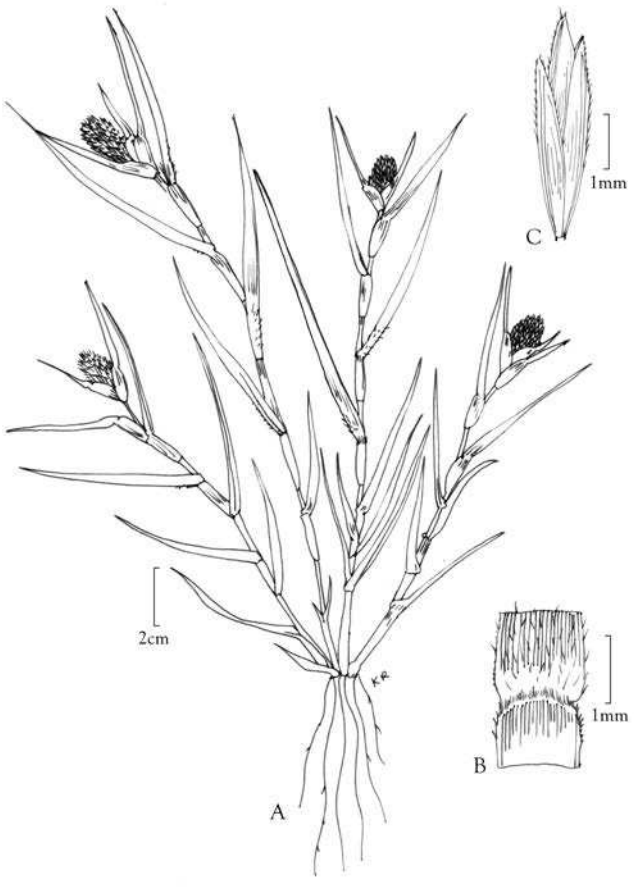


FIGURE 244. *Sporobolus schoenoides.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *H. Lindberg s.n.* (CAI); B, C drawn from *N. C. Chase 6983* (US-2464000).

glabrous. Leaves basal and cauline; the uppermost sheath conspicuously inflated, glabrous, margins smooth; ligules 1–2 mm long, a fringe of hairs; blades 2–10 cm long, 2–3.5 mm wide, lanceolate, flat, appressed, sparsely hairy on lower surfaces, margins glandular, bases cordate, apex acuminate. Panicles 0.5–3 cm long, capitate, elliptic or oblong, subtended by inflated leaf sheaths (spatheoles). Spikelets 2.5–4 mm long, 1-flowered, laterally compressed, falling entire; lemmas 2.5–4 mm long, awnless. Habitat: rocky slopes, sandy and saline soils. Distribution: (Mm, Nv) Mediterranean and temperate Asia.

236. *Sporobolus spicatus* (Vahl) Kunth

FIGURE 245

Sporobolus spicatus (Vahl) Kunth, Révis. Gramin. 1:67. 1829.
Common names: *negil shoki, rukeib, sabat, sabat gabali, silla*.

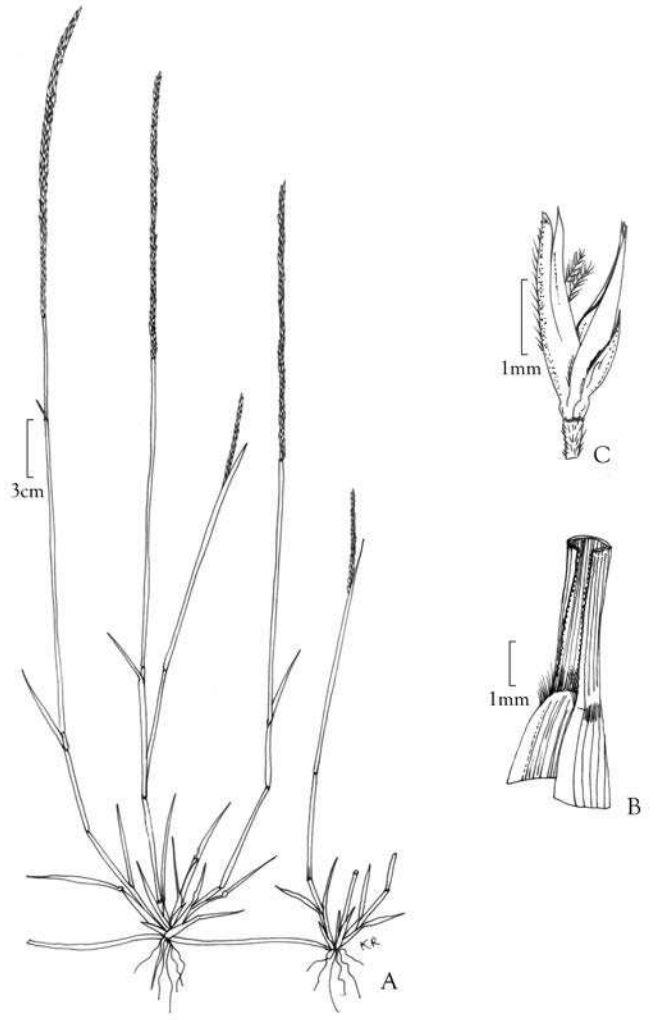


FIGURE 245. *Sporobolus spicatus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *L. Boulos s.n.* (CAI); B drawn from *P. Greenway 8766* (US-2464345).

Mat-forming perennials; stolons present. Culms 10–70 cm tall, erect, wiry, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, glabrous, margins membranous; oral hairs present; ligule a fringe of hairs; blades 2–25 cm long, 1–3 mm wide, flat or convolute, straight, ascending, hairy on basal ⅓, margins pubescent, apex spiny pungent. Panicles 1.5–20 cm long, 0.2–0.4 cm wide, spiciform, linear. Spikelets 1.4–2.2(–2.8) mm long, 1-flowered, lanceolate, subterete, appressed; lemmas 0.8–2.2 mm long, awnless. Habitat: saline soils and sandy areas. Distribution: (Nv, Nn, Dl, Dg, Da, Ol, On, S, Ra, Ge) Africa to India.

237. *Sporobolus wrightii** Munro ex Scribn.

FIGURE 246

*Sporobolus wrightii** Munro ex Scribn., Bull. Torrey Bot. Club 9: 103. 1882.
Common name: giant sacaton.

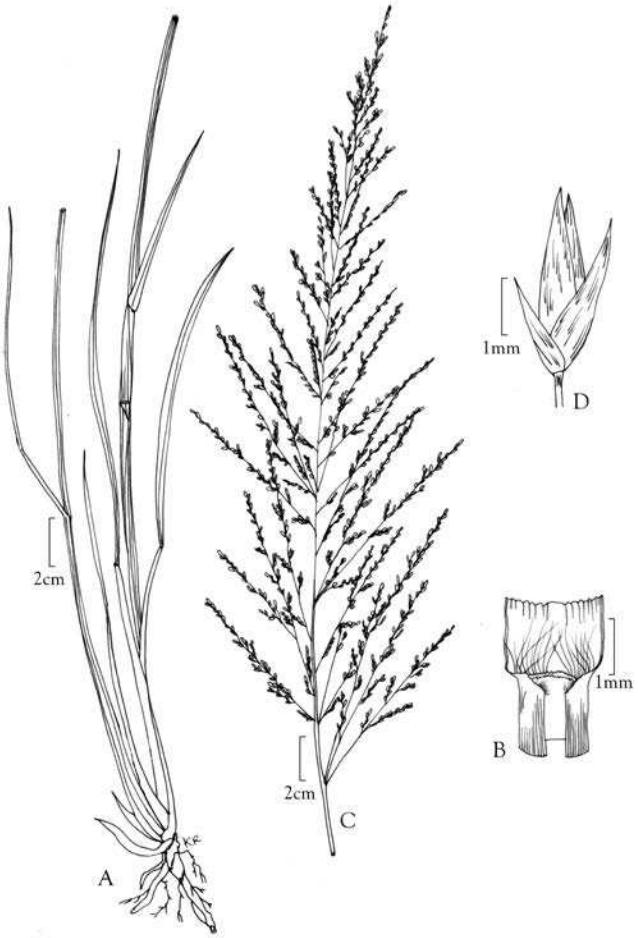


FIGURE 246. *Sporobolus wrightii.* A. Culm. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–D drawn from *H. S. Gentry 8580* (US-1984316).

Caespitose perennials. Culms up to 200 cm tall, erect, robust; internodes glabrous, striped; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins membranous; ligules 1–2 mm long, a fringe of hairs; blades 20–60 cm long, 3–10 mm wide, flat, straight, ascending, surfaces scabrous, margins scabrous, apex acuminate. Panicles 20–60 cm long; 12–26 cm wide, open, broadly lanceolate. Spikelets 1.5–2.5 mm long, 1-flowered, lanceolate, subterete; lemmas 1.2–2.5 mm long, awnless. Habitat: introduced from North America. Distribution: (Mm) USA and Mexico.

238. *Stenotaphrum secundatum** (Walter) Kuntze

FIGURE 247

*Stenotaphrum secundatum** (Walter) Kuntze, Revis. Gen. Pl. 2: 794. 1891.
Common names: *negeil faransawi*; Saint Augustine grass.

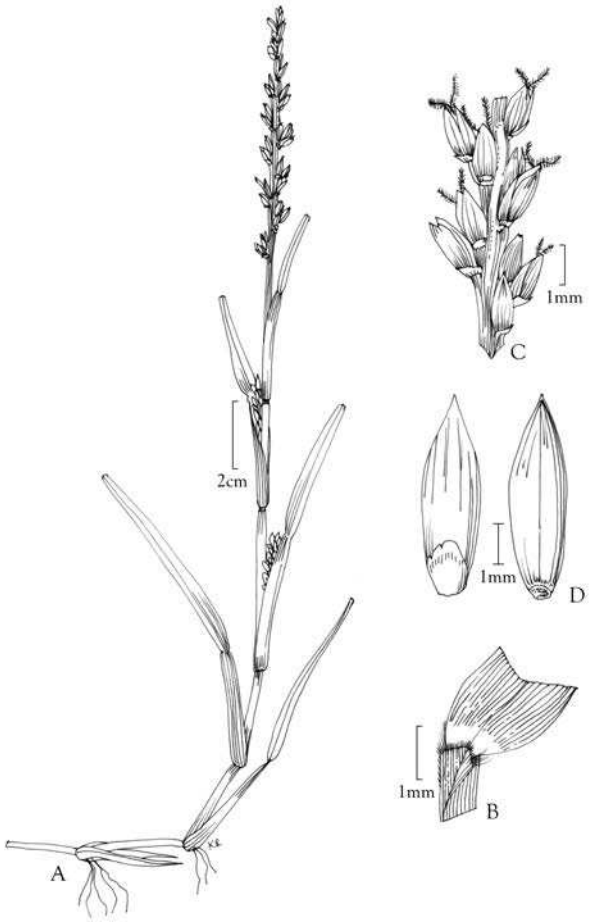


FIGURE 247. *Stenotaphrum secundatum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence branch. D. Spikelets with upper (right) and lower (left) glumes. A drawn from *V. Täckholm s.n.* (CAI); B drawn from *A. J. Oakes 1270* (US-3025891); C modified from Cope (2005); D modified from Allred (2003).

Caespitose perennials; stolons present. Culms 10–30 cm tall, decumbent; internodes glabrous; lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, compressed, ribbed, glabrous, margins hairy; oral hairs present; ligule a fringe of hairs; blades 2–15 cm long, 4–10 mm wide, linear lanceolate, flat or conduplicate, straight, spreading, scabrous, margins smooth, apex obtuse. Inflorescences 3–10 cm long, composed of racemes wholly or partially sunk in a corky central axis; racemes 0.5–1 cm long. Spikelets 4–5 mm long, oblong, dorsally compressed; lemmas 4–4.5 mm long, awnless. Habitat: cultivated as lawn grass, introduced. Distribution: (N) Atlantic coasts of Africa and America.

239. *Stipa arabica* Trin. & Rupr.

FIGURE 248

Stipa arabica Trin. & Rupr., Sp. Gram. Stipac. 77. 1842.
Common name: *hamara*.

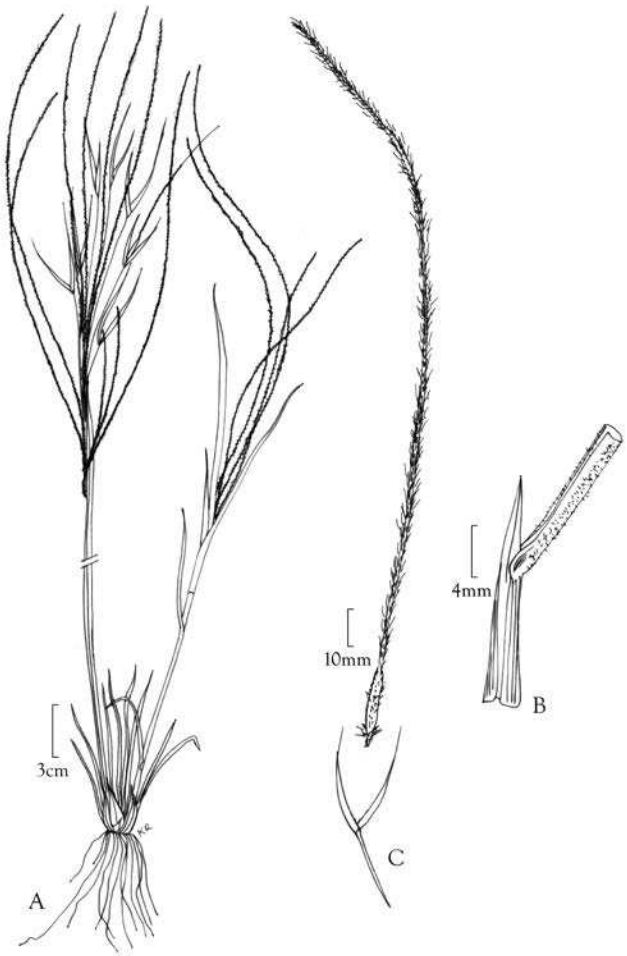


FIGURE 248. *Stipa arabica.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *Grizi 243* (CAI); B, C drawn from *L. Chevallier s.n.* (US-550403) and *A. Gray 270* (US-993566).

Densely caespitose perennials. Culms 30–70(–100) cm tall, decumbent; internodes pubescent; nodes dark; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, ribbed, margins smooth; ligules 6–8 mm long, membranous, apex acute; blades 4–6 cm long, 1–2.5 mm wide, filiform, involute, straight, stiff, sparsely hairy, margins ciliate, apex attenuate. Panicles 15–35 cm long open, linear, bearing few spikelets, partially included in the sheath. Spikelets 25–35 mm long, lanceolate, subterete; lemmas 9–15 mm long including the pungent callus 1–1.5 mm long, lemma awns 10–16(–22) cm long, bigeniculate, feathery, column twisted. Habitat: stony ground. Distribution: (S) E Mediterranean region to Pakistan.

240. *Stipa lagascae* Roem. & Schult.

FIGURE 249

Stipa lagascae Roem. & Schult., Syst. Veg., ed. 15 bis, 2: 333. 1817. [*Stipa gigantea* var. *lagascae* (Roem. & Schult.) Hack. ex Kneuck.]

Common name: *gawther*.

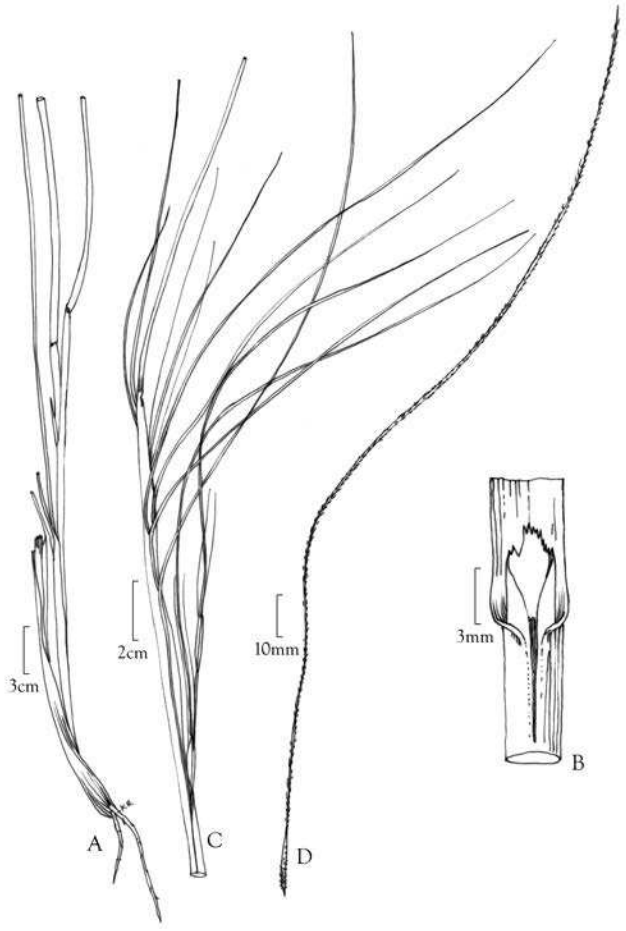


FIGURE 249. *Stipa lagascae*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Floret. A–D drawn from *G. C. Joad s.n.* (US-152837).

Densely caespitose perennials. Culms 30–60 cm tall, erect, woody; internodes glabrous; butt sheaths pubescent. Leaves mostly basal; sheaths glabrous, ribbed, margins hairy; ligules 6–8 mm long, membranous; blades 15–30 cm long, 1–2 mm wide, filiform, convolute or bristlelike, straight, stiff, scaberulous, margins scabrous, apex attenuate. Panicles 25–40 mm long, partially included in the sheath. Spikelets 25–40 mm long, lanceolate, subterete; lemmas 17–23 mm long including the acuminate pungent callus 3–4 mm long, lemma awns 16–30 cm long, bigeniculate, feathery, column twisted. Habitat: rocky slopes and sandy areas. Distribution: (Mm, Nv, Di) shores of the southern Mediterranean.

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

FIGURE 250

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

Common name: *sakham*.

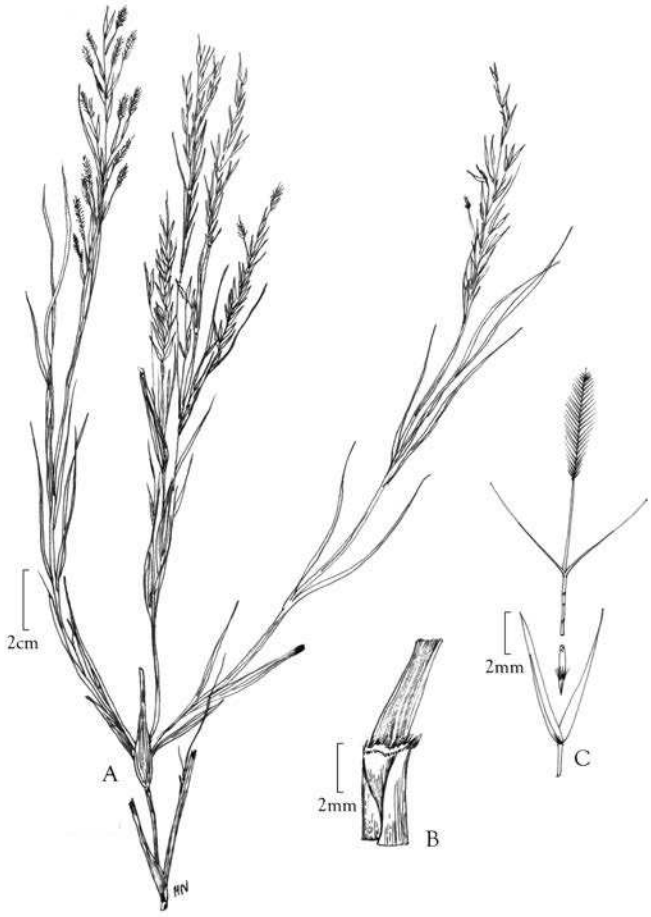


FIGURE 250. *Stipagrostis acutiflora*. A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A, C drawn from *E. Canon s.n.* (US-152805), *A. Amin s.n.* (CAI); B drawn from *L. Chevallier s.n.* (US-550638).

Caespitose perennials; stolons sometimes present. Culms 20–60 cm tall, erect, weak; internodes densely pubescent; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, glabrous, margins membranous; oral hairs present; ligules 1 mm long, a fringe of hairs; blades 4–6 cm long, 1–2 mm wide, filiform, convolute, straight or curved, stiff, scabrous, margins scabrous, apex acuminate. Panicles 5–15 cm long, open, lanceolate, sometimes included in the sheath below. Spikelets 9 mm long, lanceolate, subterete; lemmas 5 mm long, 3-awned, central awns 10–15 mm long, feathery, column slightly twisted. Habitat: sandy soils. Distribution: (Nv, Nn, Dl, Da, Di, Ug) N Africa and Arabia.

242. *Stipagrostis ciliata* (Desf.) De Winter

FIGURE 251

Stipagrostis ciliata (Desf.) De Winter, Kirkia 3: 133. 1963.
Common names: *hemeira, nessiye*.

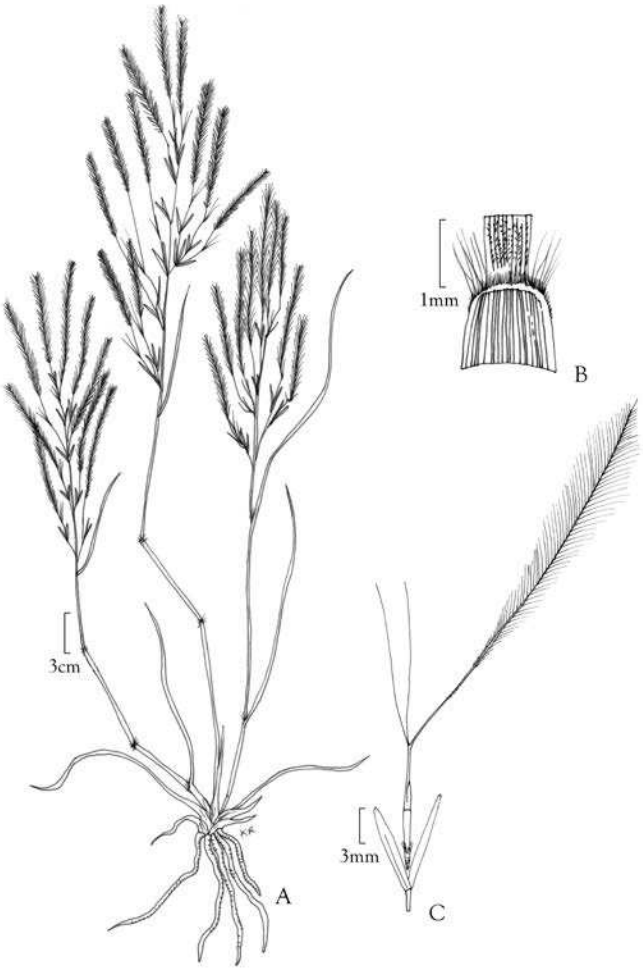


FIGURE 251. *Stipagrostis ciliata*. A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *G. Täckholm s.n.* (CAI); B, C drawn from *C. L. Smook 6839* (US-3199839).

Caespitose perennial; rhizomes short. Culms 30–80 cm tall, erect; internodes glabrous; nodes conspicuously bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than blades, ribbed, glabrous, margins smooth; ligule a fringe of hairs; blades 4–25 cm long, 1–2 mm wide, filiform, convolute or conduplicate, straight, stiff, glabrous, margins smooth, apex acuminate. Panicles 10–30 cm long, open, terminal, partially included in the sheath. Spikelets 9–14 mm long, lanceolate, subterete, lemmas 6–10 mm long, 3-awned, central awns 35–45 mm long, feathery, column twisted. Habitat: rocky and sandy soils. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, S, Ra, Ge) Micronesia, N Africa to SW Asia.

243. *Stipagrostis drarii* (Täckh.) De Winter

FIGURE 252

Stipagrostis drarii (Täckh.) De Winter, Kirkia 3: 133. 1963.

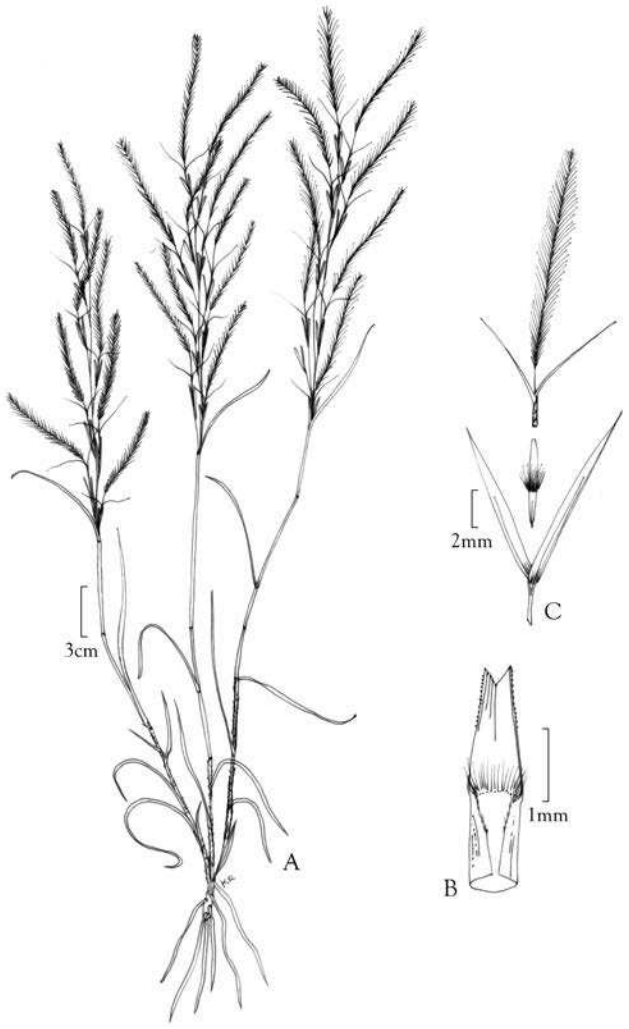


FIGURE 252. *Stipagrostis drarii*. A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *Migahid 492-A* (CAI); B, C drawn from *S. Collenett 5735* (K-H2012/008996).

Caespitose perennials. Culms 50–100 cm tall, erect, woolly; butt sheaths glabrous. Leaves mostly basal; sheath longer than adjacent internodes, ribbed, glabrous, margins smooth; ligule a fringe of hairs; blades 15–30 cm long, 1–1.5 mm wide, filiform, convolute, curly, stiff, ribbed, scabrous, margins scabrous, apex spiny pungent. Panicles 10–30 cm long, terminal, open, elliptic, partially included in the sheath. Spikelets 9.5–10.5 mm long, lanceolate, subterete; lemmas 4.5–5.5 mm long, 3-awned, central awns 13–25 mm long, feathery, columns twisted. Habitat: desert sands. Distribution: (Di) Arabia and Iraq.

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

FIGURE 253

Stipagrostis hirtigluma (Steud. ex Trin. & Rupr.) De Winter, Kirkia 3: 136. 1963.
Common name: *qau*.

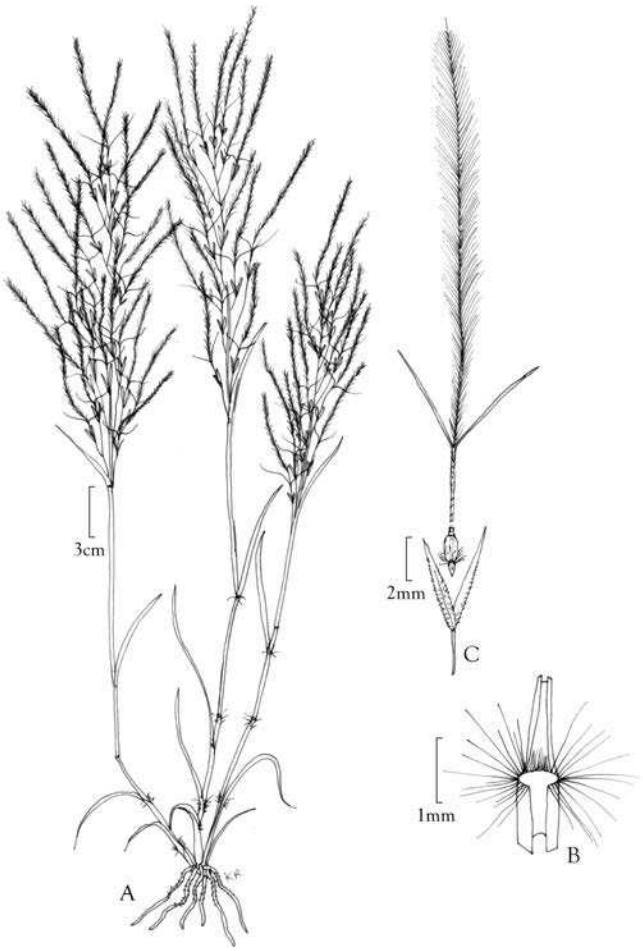


FIGURE 253. *Stipagrostis hirtigluma.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby & M. Zahran 369* (CAI); B, C drawn from *J. P. Mandaville 3369* (US-2653898).

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

245. *Stipagrostis lanata* (Forssk.) De Winter

FIGURE 254

Stipagrostis lanata (Forssk.) De Winter, Kirkia 3: 135. 1963.
Common names: *ain seela, sakham, shafshoof*.



FIGURE 254. *Stipagrostis lanata.* A. Habit. B. Ligule, sheath, and blade. C.Glumes and floret. D. Inflorescence. A drawn from *R. Ibrahim s.n.* (CAI), *G. Maire s.n.* (CAI); B–D drawn from *G. Schweinfurth 437* (US-806226).

Caespitose perennials. Culms 10–20 cm tall, erect or decumbent; lower internodes densely woolly; butt sheaths glabrous. Leaves mostly basal; sheaths ribbed, glabrous, margins membranous; ligule a fringe of hairs; blades 4–10 cm long, 1–2 mm wide, linear, convolute, curly or flexuous, scabrous, margins smooth, apex attenuate. Panicles 10–13 mm long, lanceolate, subterete, partially included in the sheath. Spikelets 13–14 mm long, lanceolate, subterete; lemmas 4–5 mm long, 3-awned, central awns 30–35 mm long, feathery, column twisted. Habitat: sandy dunes sometimes associated with palm trees. Distribution: (Mm, Ms, Nv, Dl, Di) N Africa and SW Asia.

246. *Stipagrostis multinerva* Scholz

FIGURE 255

Stipagrostis multinerva Scholz, Österr. Bot. Z. 117: 289. 1969.

Caespitose perennials. Culms 10–30 cm tall, decumbent; lower internodes woolly; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins smooth; ligule a fringe of hairs; blades 4–10 cm long, 1–2.5 mm wide, filiform, involute, straight, stiff, scabrous, margins smooth, apex attenuate. Panicles 2–8 cm long, open, terminal, linear, partially included in the sheath. Spikelets 14–16 mm long, lanceolate, subterete; lemmas 6–7 mm long, 3-awned, central awns 35–45 mm long, feathery, column twisted. Habitat: sandy areas. Distribution: (S) Arabian peninsula.

247. *Stipagrostis obtusa* (Delile) Nees

FIGURE 256

Stipagrostis obtusa (Delile) Nees, Linnaea 7: 293. 1932.
Common names: *dhareri, safsoof*.

Mat-forming perennials. Culms 10–30 cm tall, erect, pubescent; nodes dark; butt sheaths with whitish fibers, otherwise

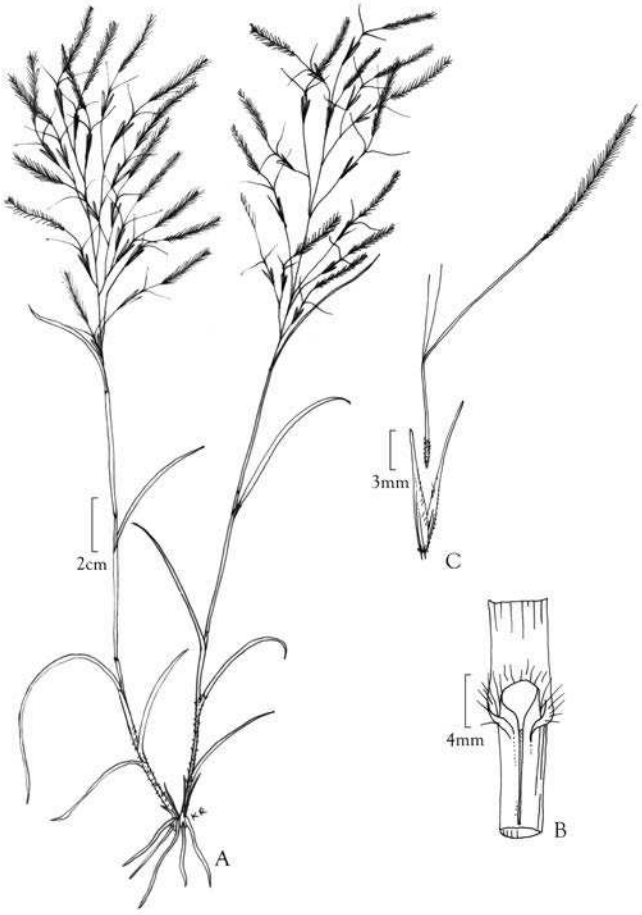


FIGURE 255. *Stipagrostis multinerva.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A–C drawn from *H. St. John Philby 22* (BM-000797730).

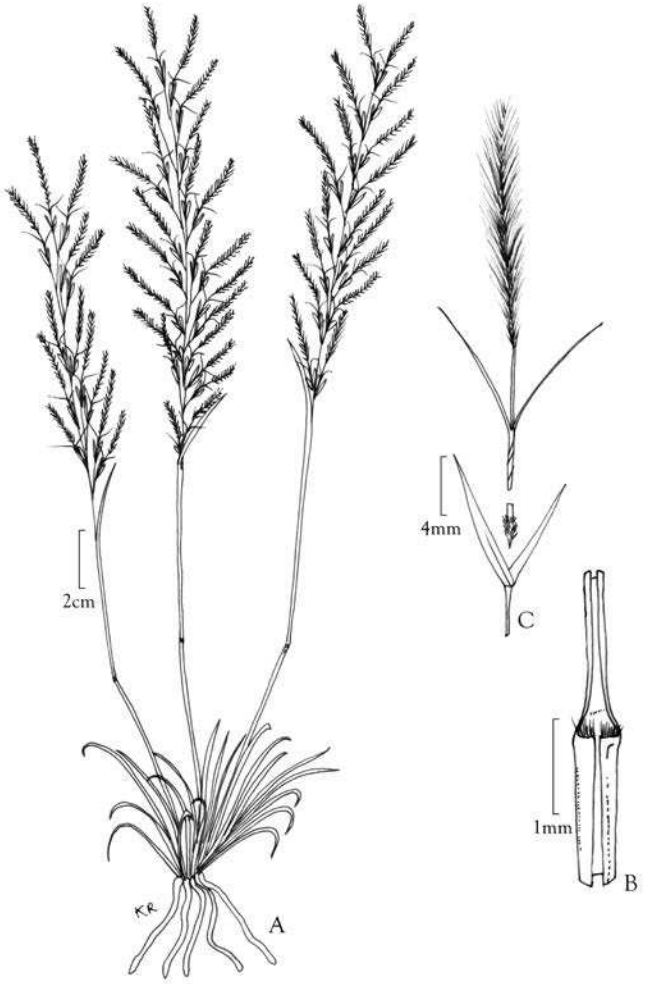


FIGURE 256. *Stipagrostis obtusa.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *D. Podlech 33371* (CAI); B, C drawn from *C. Aurich & H. Forther s.n.* (US-3343372).

glabrous. Leaves mostly basal; sheaths ribbed, glabrous, margins membranous; oral hairs present; ligule a fringe of hairs; blades 4–25 cm long, 0.5–1.5 mm wide, linear, filiform, convolute, ascending, ribbed, smooth or scaberulous, margins smooth, apex obtuse. Panicles 2.5–20 cm long, terminal, contracted, linear, continuous or interrupted, partially included in the sheath. Spikelets 8.5–12 mm long, lanceolate, subterete; lemmas 2–2.5 mm long, 3-awned, central awns 20–30 mm long, feathery, column twisted. Habitat: stony, sandy, and gravelly sites. Distribution: (Mm, Nv, Dg, Di) N Africa to SW Asia.

248. *Stipagrostis paradisea* (Edgew.) De Winter

FIGURE 257

Stipagrostis paradisea (Edgew.) De Winter, Kirkia 3: 135. 1963.

Caespitose perennials. Culms 10–40 cm tall, erect, glabrous, much branched at the base; butt sheaths glabrous, persistent.

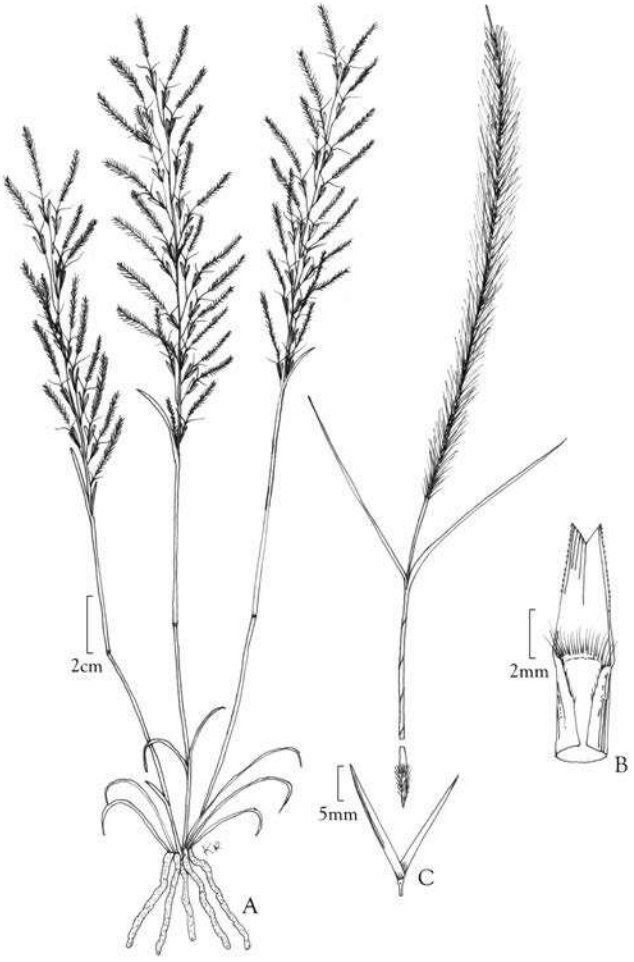


FIGURE 257. *Stipagrostis paradisea.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *M. Fathallah s.n.* (CAI); B, C drawn from *K. H. Rechinger 31026* (US-2637383).

Leaves mostly basal; sheaths ribbed, glabrous, margins smooth; ligule a fringe of hairs; blades 3–20 cm long, 0.5–1.5 mm wide, linear, filiform, convolute, ascending, glabrous, margins smooth, apex pungent. Panicles 10–15 cm long, open, terminal, partially included in the sheath. Spikelets 16–19 mm long, lanceolate, subterete; lemmas 3.5–5 mm long, 3-awned, central awns 45–70 mm long, feathery, column twisted. Habitat: rocky ground. Distribution: (Nv, Dg) Somalia and SW Asia.

249. *Stipagrostis plumosa* (L.) Munro ex T. Anderson

FIGURE 258

Stipagrostis plumosa (L.) Munro ex T. Anderson, J. Linn. Soc., Bot. 5(Suppl. 1): 40. 1860.

Common names: *dreira, nessiye, qaba, sh'aish*.

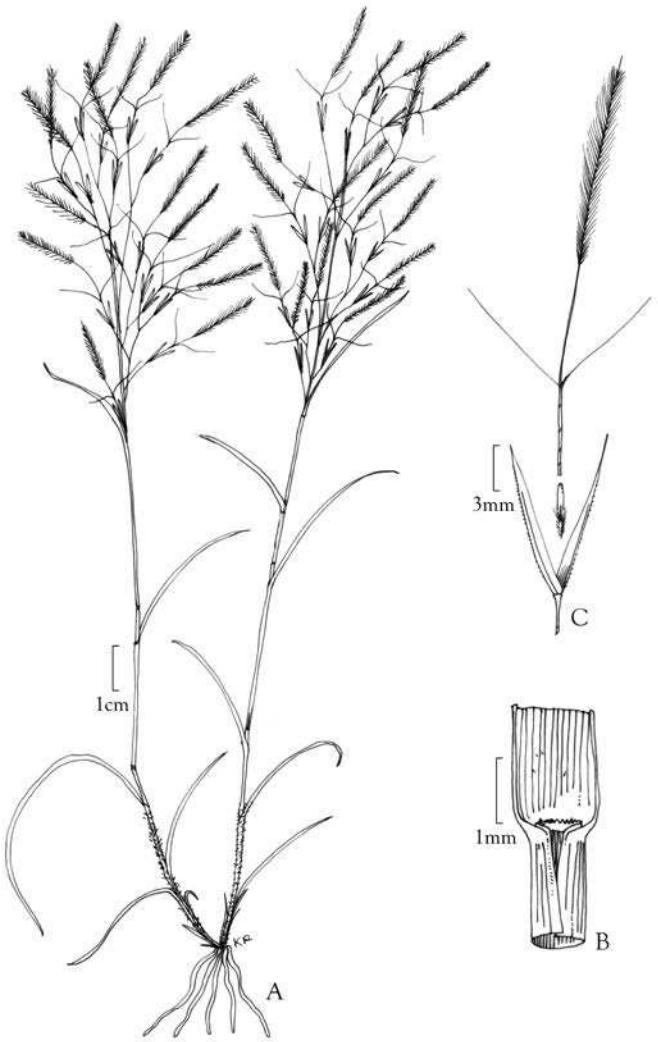


FIGURE 258. *Stipagrostis plumosa.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *L. Boulos s.n* (CAI); B, C drawn from *F. A. Barkley & A. Askari 1799* (US-2381495).

Caespitose perennials. Culms 10–30 cm tall, erect; internodes densely woolly; nodes dark; butt sheaths woolly. Leaves basal and cauline; sheaths longer than adjacent internodes, ribbed, glabrous or lower densely woolly, margins smooth; ligule a fringe of hairs; collars dark; blades 4–12 cm long, 1–3 mm wide, filiform, convolute, curly, glabrous, margins smooth, bases narrow, apex spiny pungent. Panicles 6–15 cm long, terminal, contracted, lanceolate, partially included in the sheath. Spikelets 11–15 mm long, lanceolate, subterete; lemmas 3.5–5.5 mm long, 3-awned, central awns 25–60 mm long, feathery, column twisted. Habitat: stony and sandy soils. Distribution: (Mm, Ms, Nv, Nn, Dl, Da, Dg, Di, Ol, S, Ra, Ge) Mediterranean region and SW Asia.

250. *Stipagrostis raddiana* (Savi) De Winter

FIGURE 259

Stipagrostis raddiana (Savi) De Winter, Kirkia 3: 135. 1963.
Common name: *nussi*.

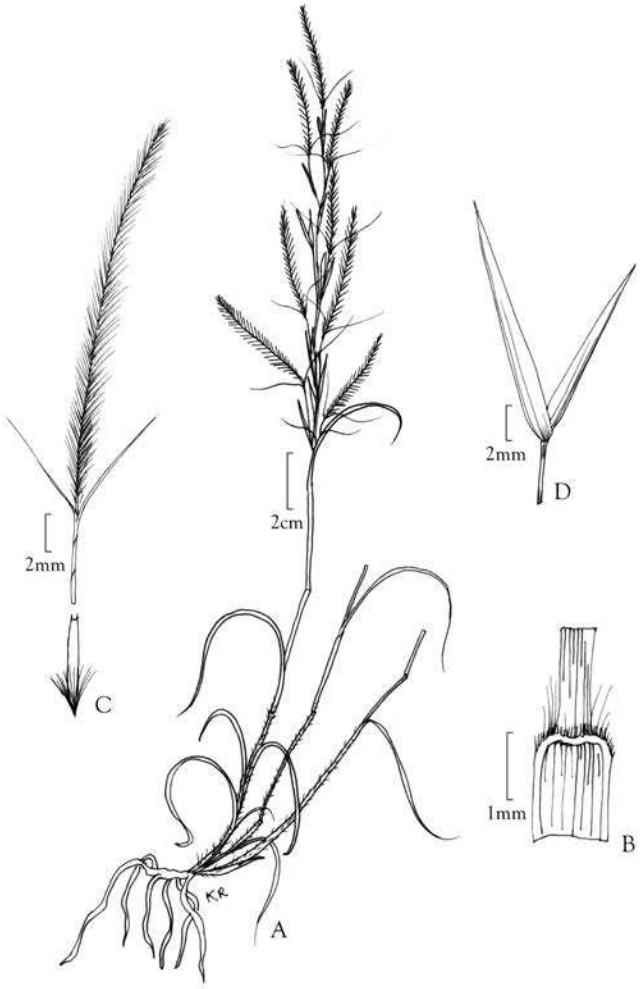


FIGURE 259. *Stipagrostis raddiana.* A. Habit. B. Ligule, sheath, and blade. C. Floret. D. Glumes. A: *Migahid 386-M* (CAI); B–D: *V. Tackholm s.n.* (K-2012/00899).

Caespitose perennials; rhizomes elongated. Culms 10–40 cm tall, erect, pubescent; internodes woolly below; butt sheaths glabrous. Leaves basal and cauline, ribbed, scabrous, margins smooth; ligule a fringe of hairs; blades 10–15 cm long, 0.5–1.5 mm wide, filiform, convolute, curly, pubescent, margins scabrous, apex attenuate. Panicles 10–20 cm long, terminal, contracted, partially included in the sheath. Spikelets 13–16 mm long, lanceolate, subterete; lemmas 4 mm long, 3-awned, central awns 50 mm long, feathery, column twisted. Habitat: sandy and rocky desert. Distribution: (Nv, Dg, Da, S, Ge) N Africa and SW Asia.

251. *Stipagrostis scoparia* (Trin. & Rupr.) De Winter

FIGURE 260

Stipagrostis scoparia (Trin. & Rupr.) De Winter, Kirkia 3: 136. 1963.
Common name: *sabat*.

Caespitose perennials. Culms 30–60 cm tall, erect, glabrous, striate; butt sheaths glabrous. Leaves basal and cauline; sheaths

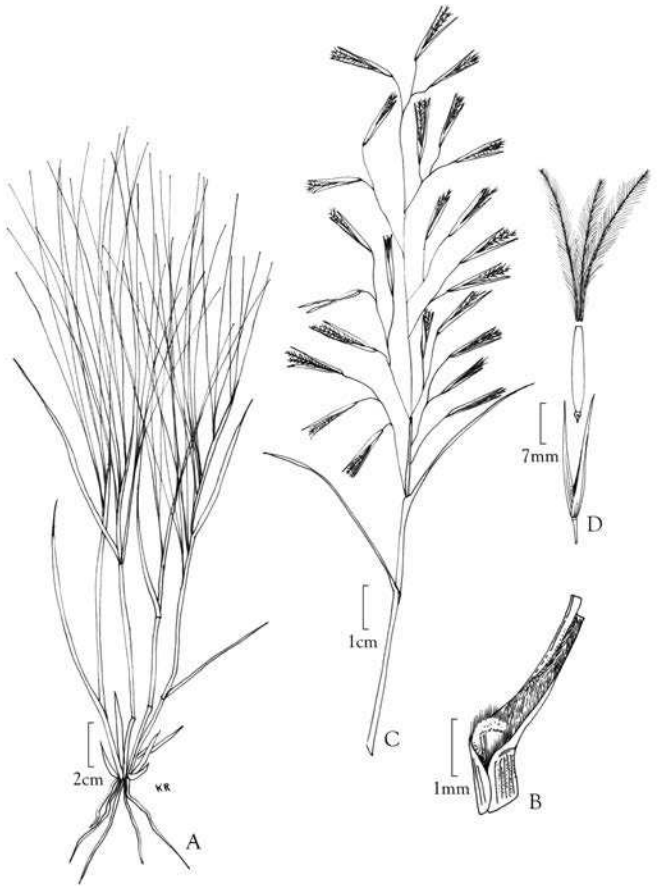


FIGURE 260. *Stipagrostis scoparia.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Glumes and floret. A drawn from *L. Boulos s.n.* (CAI); B–D drawn from *G. Schweinfurth 447* (US-806228).

flattened, glabrous, margins scabrous; ligule a fringe of hairs; blades 10–25 cm long, 0.5–1.5 mm wide, filiform, convolute, curved, scabrous, margins smooth, apex spiny pungent. Panicles 20–40 cm long, 15 cm wide, open, terminal, elliptic, effuse. Spikelets 18–22 mm long, lanceolate, subterete; lemmas 5–6 mm long, 3-awned, central awns 7–9 mm long, feathery, column twisted. Habitat: sandy soils. Distribution: (Mm, Ms, Nv, Dl, Dg, Di, Ol, On) N Africa and SW Asia.

252. *Stipagrostis shawii* (Scholz) Scholz

FIGURE 261

Stipagrostis shawii (Scholz) Scholz, Österr. Bot. Z. 117: 290. 1969.

Caespitose annuals. Culms 10–15 cm long, tall; internodes pubescent, lower woolly; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, lower woolly, margins smooth; ligule a fringe of hairs; blades 5–10 cm long, 0.5–1.5 mm wide, filiform, convolute, ascending, pubescent, margins smooth, apex attenuate.

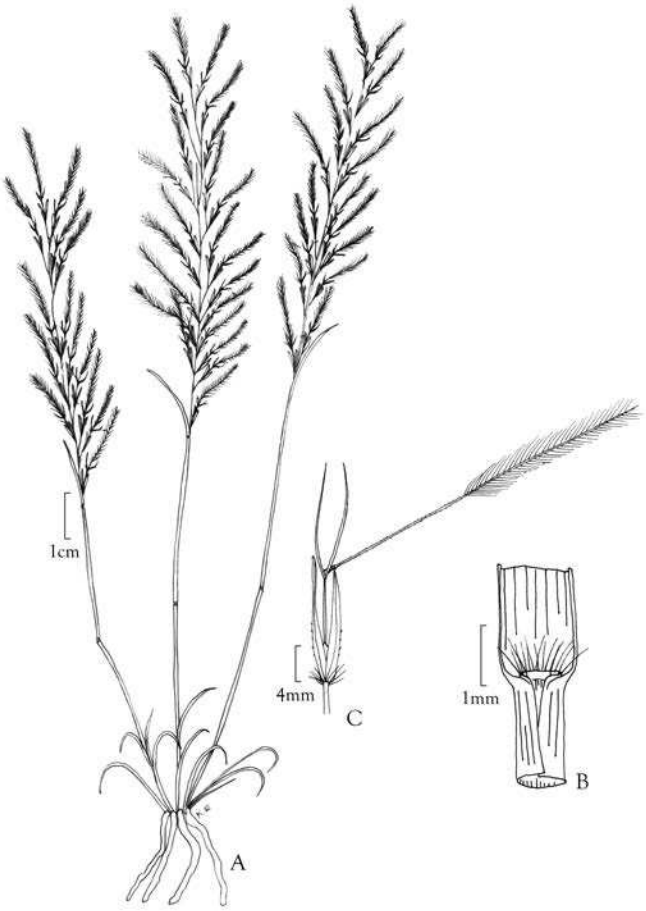


FIGURE 261. *Stipagrostis shawii*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *W. B. K. Shaw 29* (K-H2012/00821-1).

Panicles 5–10 cm long, terminal, open, partially included in the sheath. Spikelets 15–16 mm long, lanceolate, subterete; lemmas 3–4 mm long, 3-awned, central awns 45–50 mm long, feathery, column straight. Habitat: sandy soil. Distribution: (Ug) N Africa.

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

FIGURE 262

Stipagrostis uniplumis (Licht.) De Winter, Kirkia 3: 136. 1963. Common name: large bushman grass.

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

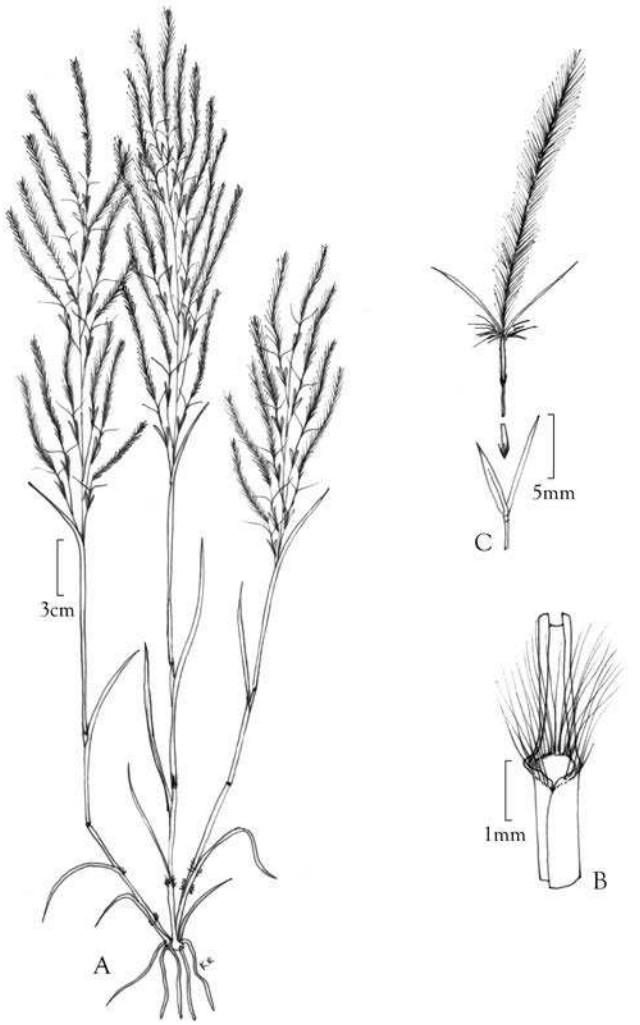


FIGURE 262. *Stipagrostis uniplumis*. A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A drawn from *V Täckholm, M. Kassas, H. Fawzi & M. Zahran 2061*; B, C drawn from *De Winter & Hardy 8063* (US-3510523).

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

254. *Stipagrostis vulnerans* (Trin. & Rupr.) De Winter

FIGURE 263

Stipagrostis vulnerans (Trin. & Rupr.) De Winter, Kirkia 3: 136. 1963.

Common names: *shok el ghazal, shoosh*.

Suffrutescent perennials; roots woolly. Culms 30–60 cm tall, erect; woody, glabrous; nodes dark; butt sheaths glabrous.

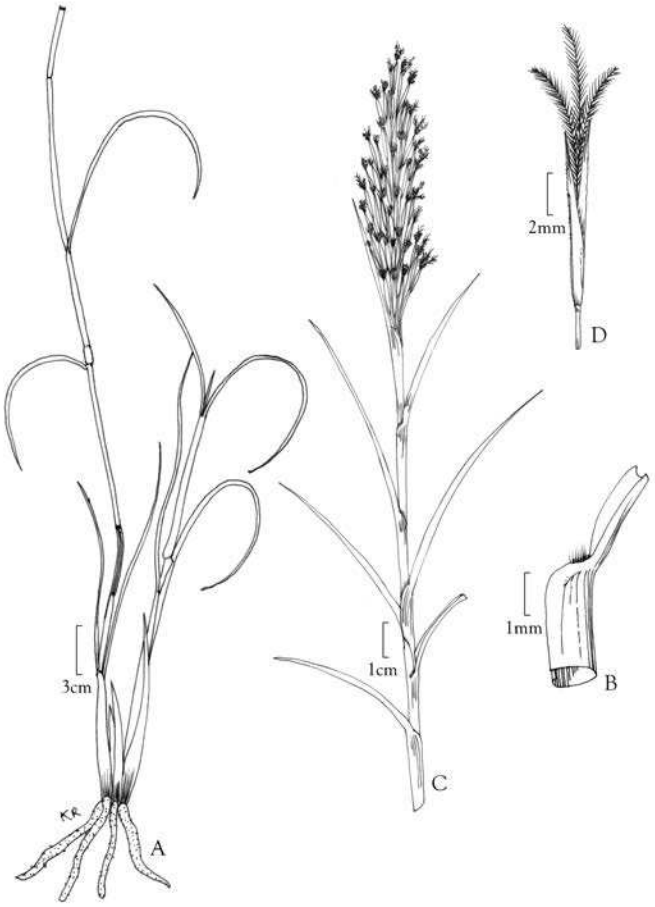


FIGURE 263. *Stipagrostis vulnerans*. A. Habit. B. Ligule, sheath, and blade. C. Culm and inflorescence. D. Spikelet. A drawn from *V. Täckholm s.n.* (CAI); B–D drawn from *W. Schimper s.n.* (US-1126510).

Leaves mostly basal; sheaths flattened, ribbed, glabrous, margins scabrous; oral hairs present; collars dark colored; ligule a fringe of hairs; blades 5–25 cm long, 0.5–1.5 mm wide, linear, filiform, convolute, spreading, scabrous, margins smooth, apex pungent. Panicles 10–20 cm long, terminal, elliptic, partially included in the sheath, branches bearded in axils. Spikelets 10 mm long, lanceolate, subterete; lemmas 5 mm long, central awns 8–10 mm long, feathery, without a column. Habitat: sandy soils. Distribution: (Nv, Nn, Da, Di, Ol) Libya.

255. *Stipellula capensis* (Thunb.) Röser & H. R. Hamasha

FIGURE 264

Stipellula capensis (Thunb.) Röser & H. R. Hamasha, Schlechtendalia 24: 92. 2012. [*Stipella capensis* (Thunb.) Röser & H. R. Hamasha; *Stipa capensis* Thunb.]

Common names: *abu nakhour, sabad, sabat, safsoof, teirra*; Mediterranean steppe grass, twisted-awned spear grass.

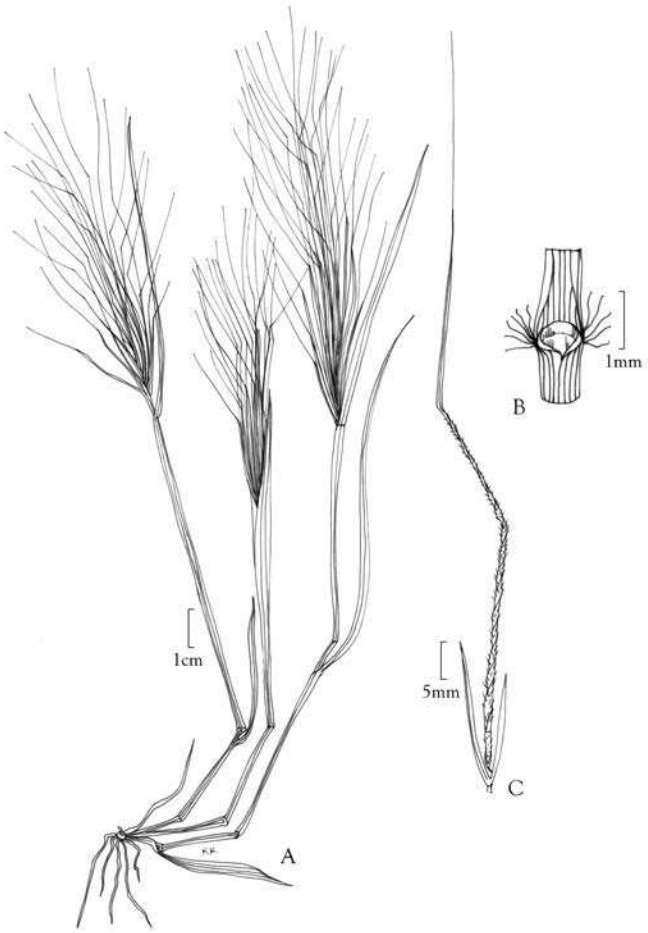


FIGURE 264. *Stipellula capensis*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, C drawn from *Hefnawy s.n.* (CAI); B drawn from *M. Winkler s.n.* (US-1649517).

Caespitose annuals. Culms 10–30 cm tall, decumbent; internodes pubescent; butt sheaths glabrous. Leaves mostly basal; sheaths longer than adjacent internodes, flattened, glabrous or pubescent, margins smooth; oral hairs present; ligules 1–2 mm long, membranous, apex truncate; blades 4–15 cm long, 1–1.5 mm wide, bristlelike, straight, stiff, sparsely hairy, margins ciliate, apex acuminate. Panicles 5–15 cm long, about 1 cm wide, partially included in the sheath. Spikelets 10–20 mm long, lanceolate, subterete; lemmas 5.5–9 mm long including the pungent callus 1.7–3.5 mm long, coriaceous, awned, the awn 60–130 mm long, bigeniculate, feathery, column twisted. Habitat: coastal sand, deserts, and rocky slopes. Distribution: (Mm, Ms, Nv, Dl, Dg, Da, Di, S, Rq, Rz) Mediterranean to NW India, S Africa.

256. *Stipellula parviflora* (Desf.) Röser & H. R. Hamasha

FIGURE 265

Stipellula parviflora (Desf.) Röser & H. R. Hamasha, Schlechtendalia 24: 92. 2012. [*Stipella parviflora* (Desf.) Röser & H. R. Hamasha; *Stipa parviflora* Desf.]

Common names: *sabal abu el Hussein, safsoof*.

Densely caespitose perennials. Culms 30–70(–80) cm tall, erect; internodes glabrous; butt sheaths glabrous. Leaves mostly basal; sheaths glabrous, margins smooth; ligules about 2.5 mm long, membranous, smooth; blades 10–20 cm long, 3–7 mm wide, convolute or bristlelike, straight, stiff, scaberulous, margins ciliate, apex attenuate. Panicles 10–20 cm long, open, elliptic, effuse, partially included in the sheath. Spikelets 10–15 mm long, lanceolate, subterete; lemmas 5–6.5 mm long including the pungent callus 0.9–1.2 mm long, coriaceous, awned, the awns 70–100 mm long, bigeniculate, column twisted. Habitat: rocky slopes and sandy areas. Distribution: (Mm, Ms, Dg, Di, S) Mediterranean to Iran.

257. *Taeniatherum caput-medusae* (L.) Nevski

FIGURE 266

Taeniatherum caput-medusae (L.) Nevski, Trudy Sredne-Aziatsk. Gosud. Univ., ser. 8b, Bot. 17: 38. 1934.

Common names: *abu hareiba, safsouf*; medusahead rye.

Caespitose perennials. Culms 5–15 cm tall, erect, geniculate, glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, ribbed, pilose, margins scabrous; auricles clawlike; ligules 1 mm long, membranous; blades 5–15 cm long, 2–3 mm wide, linear, convolute, ascending, pilose, margins ciliate, apex acuminate. Inflorescence a single, bilateral, terminal spike; spikes 3–7 cm long. Spikelets 8–12 mm long, in pairs, linear, dorsally compressed; lemmas 8–12 mm long, awned, the awns 7–12 cm long, straight, bristly. Habitat: sandy desert. Distribution: (S) Europe and temperate Asia.

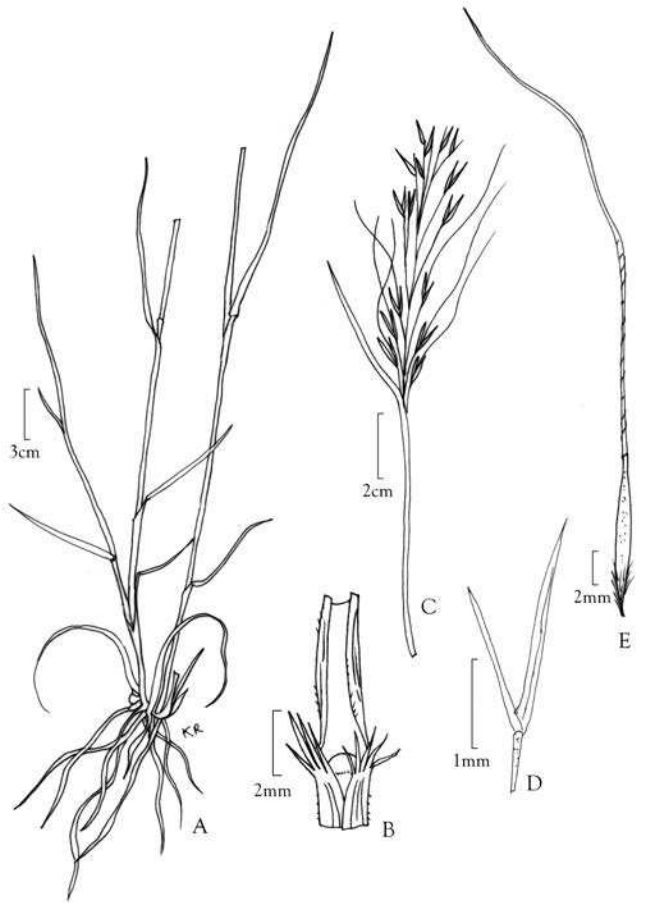


FIGURE 265. *Stipellula parviflora.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Glumes. E. Floret. A drawn from *Shabetai 3243* (CAI); B–E drawn from *C. Aurich & H. Forther s.n.* (US-3343376).

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

FIGURE 267

Tetrapogon cenchriformis (A. Rich.) Clayton, Kew Bull. 16: 250. 1962.

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

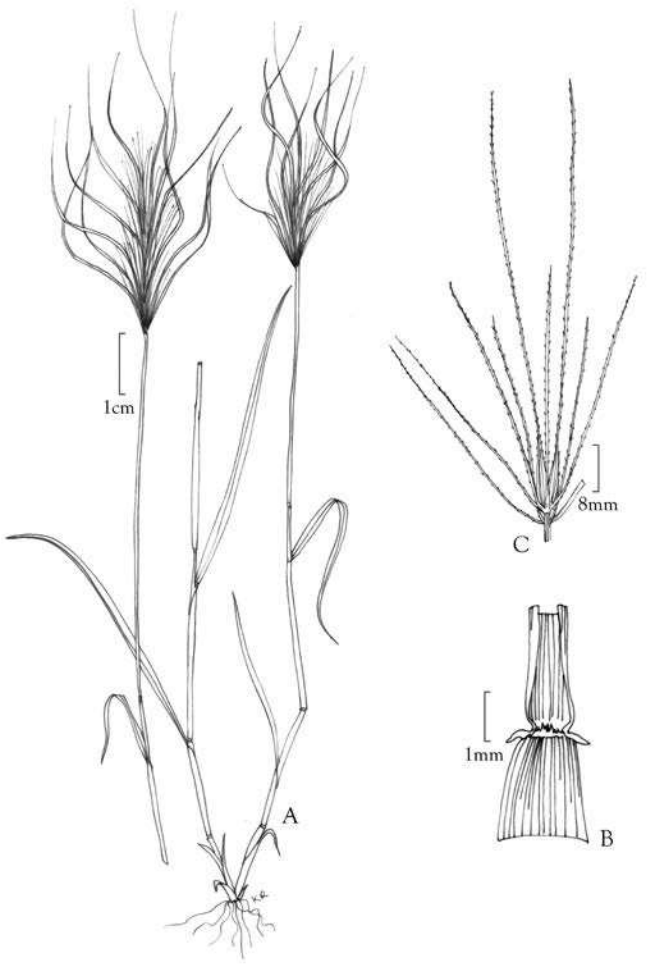


FIGURE 266. *Taeniatherum caput-medusae*. A. Habit. B. Ligule, sheath, and blade. C. Two spikelets. A drawn from *N. El Hadidi s.n.* (CAI); B, C drawn from *J. B. Gillett 8278* (US-2209402).

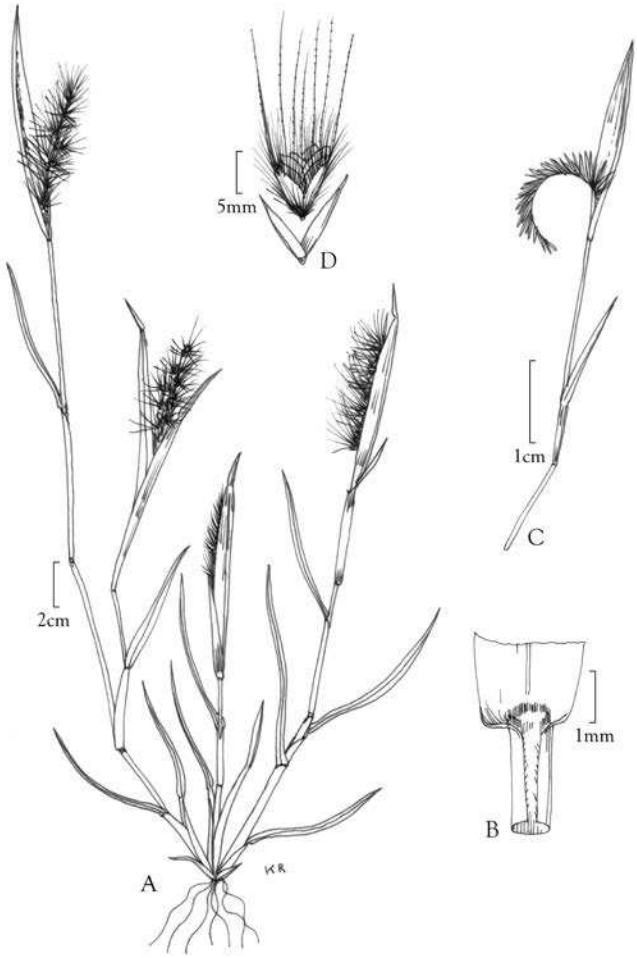


FIGURE 267. *Tetrapogon cenchriformis*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *B. Fruman 3459* (CAI); B–D drawn from *G. Schweinfurth 582* (US-1259634).

compressed, surrounded by hairs; lemmas 4–6 mm long, awned, the awns 2–8 mm long, straight. Habitat: rocky slopes. Distribution: (Ge) Micronesia, tropical Africa, and Arabia.

259. *Tetrapogon villosus* Desv.

FIGURE 268

Tetrapogon villosus Desf., Fl. Atlant. 2: 389, pl. 255. 1799.

Densely caespitose perennials. Culms 20–40 cm tall, erect, geniculate, glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths ribbed, glabrous, margins smooth; ligules 1–2 mm long, a ciliolate membrane; blades 3–8 cm long, 1–2 mm wide, linear, filiform, convolute, spreading, hairy on the basal ⅓, margins ciliate, apex obtuse. Inflorescence composed of 1 or 2 digitate racemes, terminal, partially included in the sheath; racemes 2–8 cm long, unilateral. Spikelets 3–4 mm long, cuneate, laterally compressed, surrounded by hairs; lemmas 3–3.5 mm long, awned, the awns 2–4 mm long, straight. Habitat: rocky slopes. Distribution: (Ms, Dg, Di, S, Ge) N and NE Africa to Arabia to India.

260. *Themeda triandra* Forssk.

FIGURE 269

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

Caespitose perennials. Culms 30–200 cm tall, erect, geniculate, glabrous; nodes bearded; butt sheaths glabrous, withering.

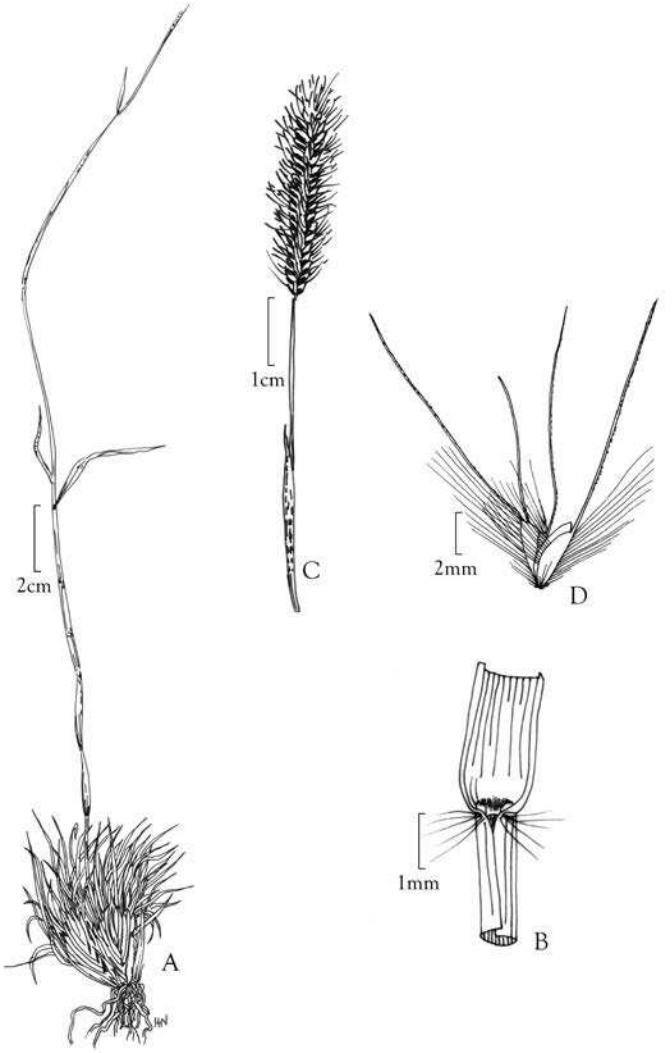


FIGURE 268. *Tetrapogon villosus.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby & M. Zahran 1022* (CAI); B–D drawn from *W. Burger 622* (US-2465208).

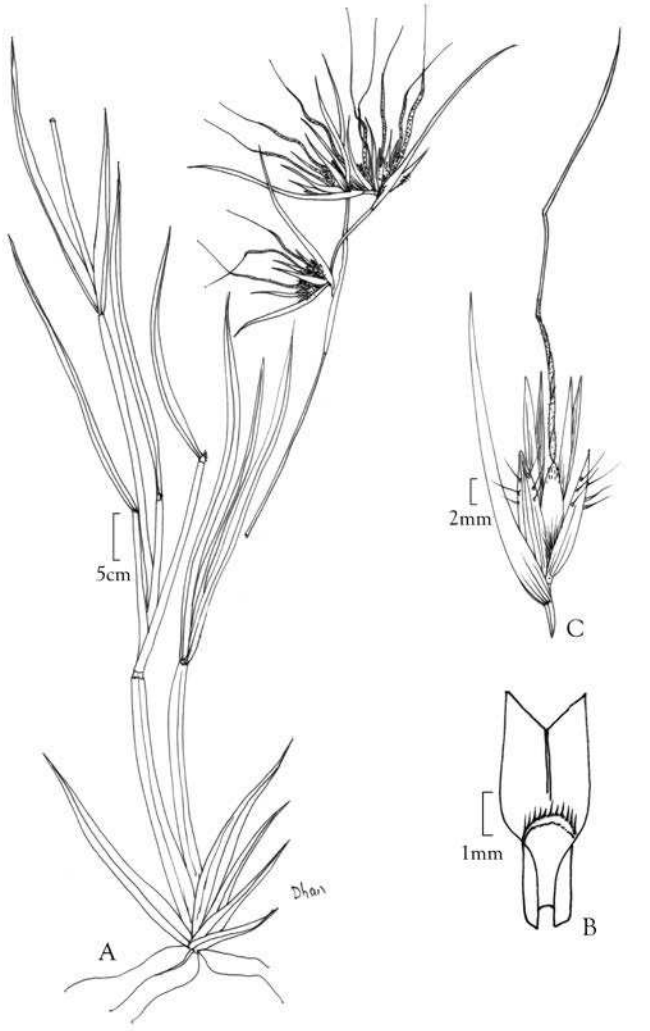


FIGURE 269. *Themeda triandra.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet cluster. A drawn from *Ibrahim 2405* (CAI), *M. Kassas 547* (CAI); B, C drawn from *E. Christie s.n.* (US-2014264).

Leaves basal and cauline; sheaths flattened, glabrous, margins scabrous; ligules 1–2 mm long, a ciliolate membrane; blades 10–30 cm long, 1–4 mm wide linear, ascending, glabrous, margins smooth, apex acute. Inflorescences 10–30 cm long, composed of terminal and axillary racemes, subtended by a spatheole; spatheoles 1.5–3.5 cm long, lanceolate, scarious, brown or red, sometimes tuberculate. Spikelets 6–11 mm long, in threes, elliptic, subterete, surrounded by hairs; fertile florets 6–11 mm long, sessile, awned, the awns 25–70 mm long, terminal, geniculate, bristly. Habitat: sandy and stony slopes. Distribution: (Nv) tropical and subtropical Old World.

261. *Themeda villosa** (Poir.) A. Camus

FIGURE 270

*Themeda villosa** (Poir.) A. Camus, Fl. Indo-Chine 7: 364. 1922.

Caespitose perennials. Culms 2–3 m tall, robust, erect, geniculate; internodes glabrous; butt sheaths glabrous, withering. Leaves basal and cauline; sheaths flattened, keeled, glabrous, margins scabrous; oral hairs present; ligules 1–2 mm long, a ciliate membrane; blades 50–100 cm long, 5–25 mm wide, linear, ascending, glabrous, margins smooth, apex acute. Inflorescences 30–60 cm long, composed of terminal and axillary racemes, subtended by a spatheole; spatheoles 2.5–3.5 cm long, lanceolate,

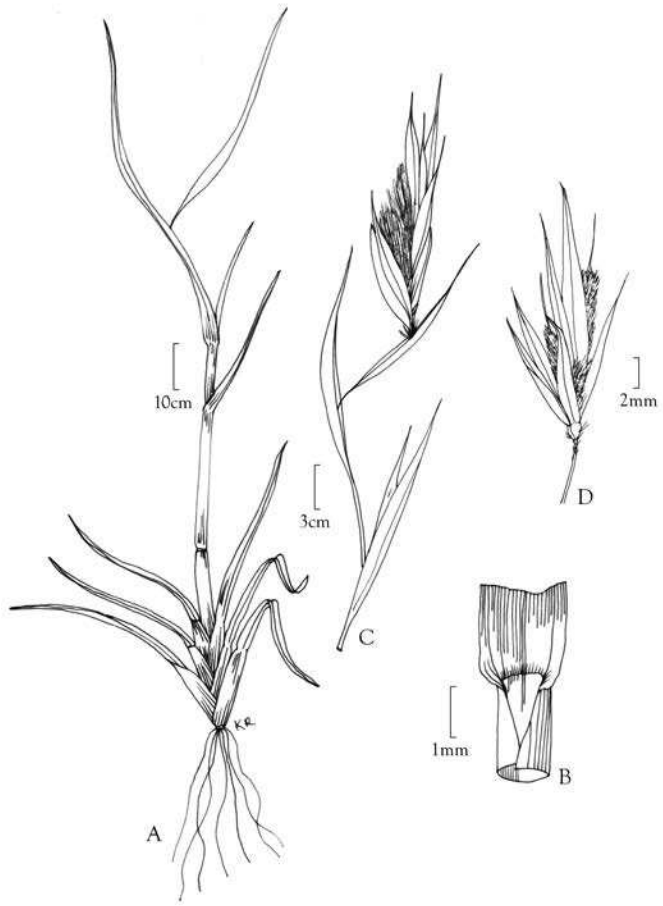


FIGURE 270. *Themeda villosa*. A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet cluster. A drawn from *M. Kassas 547* (CAI); B, D drawn from *D. Clayton 5361* (US-2590594A); C modified from Ibrahim and Kabuye (1988).

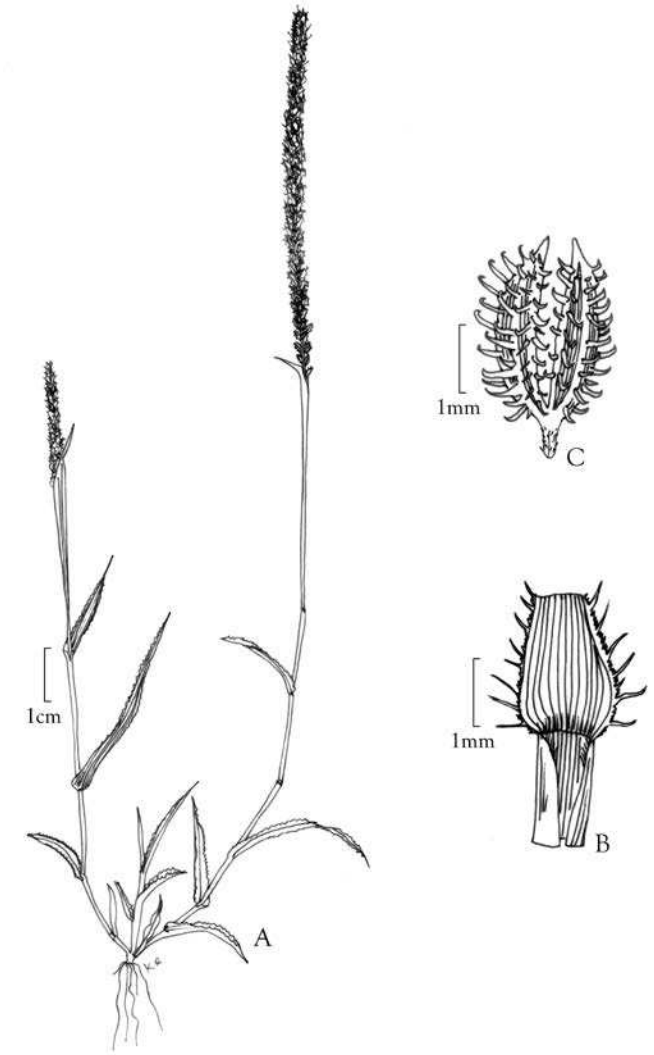


FIGURE 271. *Tragus berteronianus*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, M. Zahran, M. Samy & A. Girgis 560* (CAI); B drawn from *A. S. Hitchcock 24840* (US-1447214); C modified from Hitchcock (1951).

scarious, green, glabrous. Spikelets 7–8 mm long, in pairs, elliptic, dorsally compressed, surrounded by hairs; fertile florets sessile, unawned or awned, the awns up to 10 mm long, geniculate, bristly. Habitat: cultivated, ornamental grass, introduced. Distribution: (Mm) native to India and SE Asia.

262. *Tragus berteronianus* Schult.

FIGURE 271

Tragus berteronianus Schult., Mant. 2: 205. 1824.
Common names: *harroay*; spiked bur grass.

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

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

FIGURE 272

Tragus racemosus (L.) All., Fl. Pedem. 2: 241. 1785.
Common names: *areibi*; stalked bur grass.

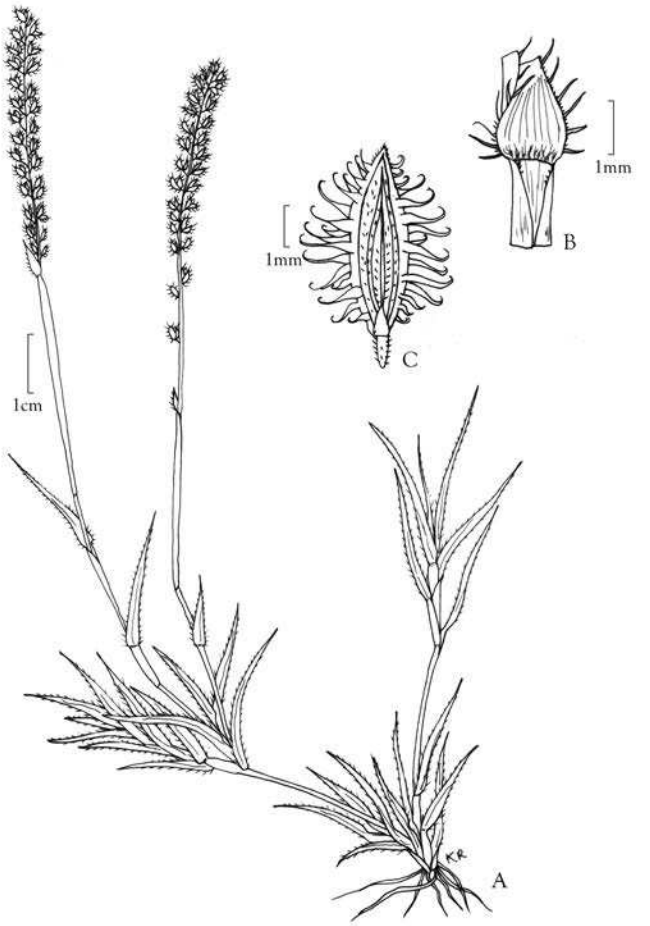


FIGURE 272. *Tragus racemosus.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A, B drawn from *R. J. Rodin 3620* (US-1983592), *A. Pappi s.n.* (US-1984347); C modified from Wipff (2003b).

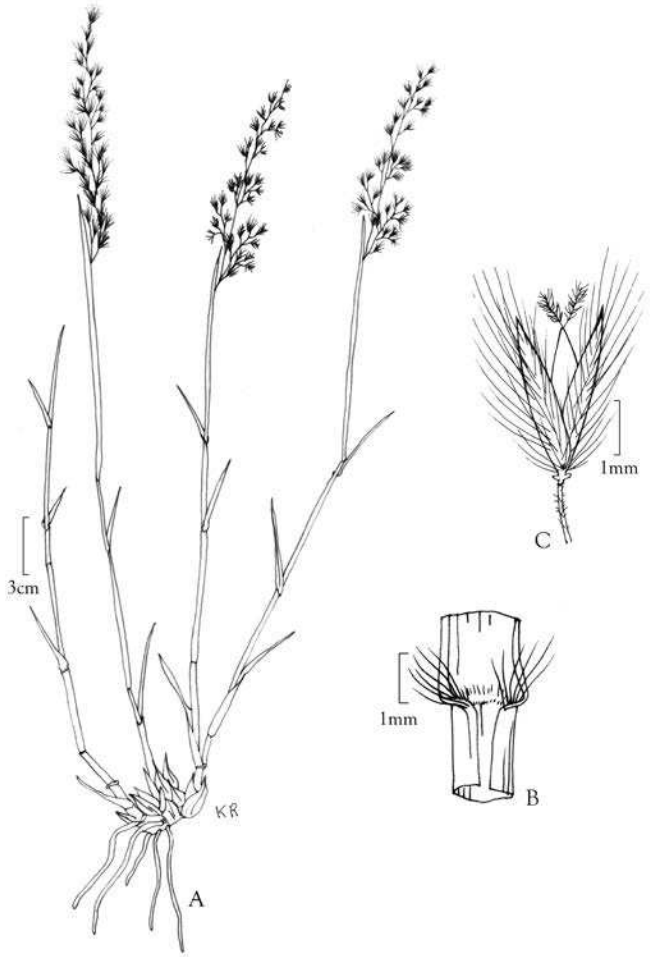


FIGURE 273. *Tricholaena teneriffae.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Samy & M. Zahran 743* (CAI); B, C drawn from *J. Pitrad s.n.* (US-1130007).

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

264. *Tricholaena teneriffae* (L.f.) Link

FIGURE 273

Tricholaena teneriffae (L.f.) Link, Handbuch 1: 91. 1829.
Common names: *sabat, yaraab*.

Caespitose perennial. Culms 10–90 cm tall, erect, geniculate, wiry; from woody rootstock; internodes pubescent; butt sheaths glabrous, persistent. Leaves basal and cauline; sheaths sparsely hairy, margins scabrous; ligule a fringe of hairs; blades 5–15 cm long, 1–5 mm wide, linear, involute, wiry, glabrous or pubescent, margins scabrous, apex acute. Panicles 5–15 cm long, 1–4 cm wide, breaking up at maturity. Spikelets 2.5–3.5 mm long, laterally compressed; fertile lemmas 2–3 mm long, dorsally compressed, awnless. Habitat: sandy and stony desert. Distribution: (Dg, Da, Di, S, Ra, Ge) Micronesia to India.

265. *Trichoneura mollis* (Kunth) Ekman

FIGURE 274

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

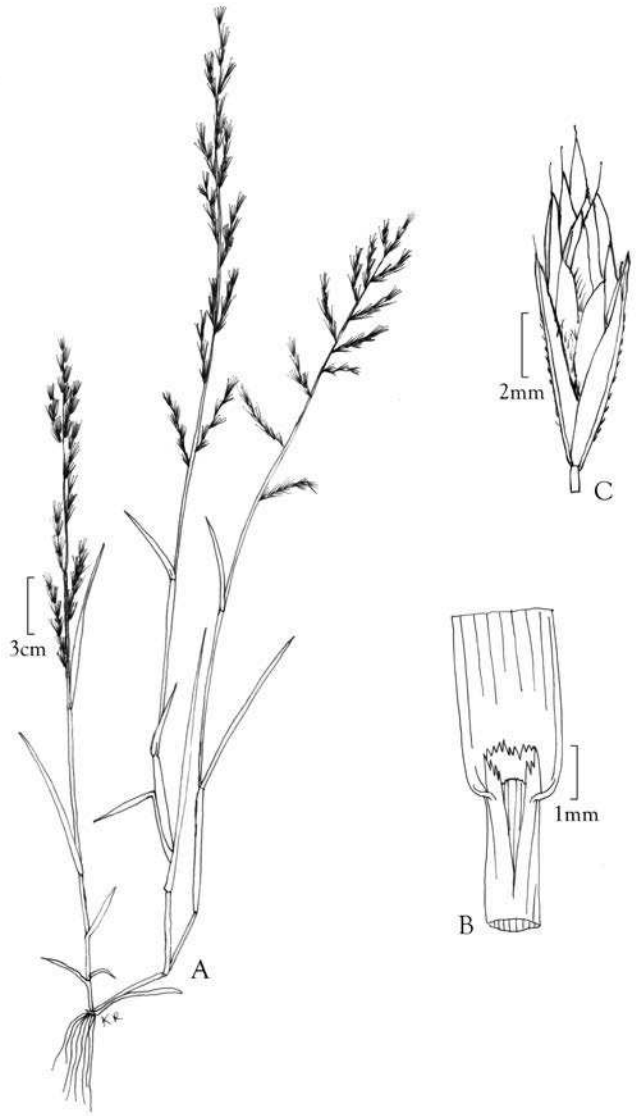


FIGURE 274. *Trichoneura mollis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, H. Fawzy, F. Shalaby, M. Samy & M. Zahran 1526* (CAI); B, C drawn from *W. Schimper* (US-1126174), *Napper 550* (US-2379660).

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

266. *Triplachne nitens* (Guss.) Link

FIGURE 275

Triplachne nitens (Guss.) Link, Hort. Berol. 2: 241. 1833.

Caespitose annuals. Culms 5–25 cm tall, erect, geniculate, glabrous, ribbed; nodes dark; butt sheaths glabrous, withering. Leaves basal and cauline; sheaths flattened, keeled, glabrous, ribbed, margins membranous; auricles clawlike; ligules 1–3 mm long, a ciliate membrane; blades 1–7 cm long, 1–3 mm wide, flat, spreading, scabrous, margins cartilaginous, apex acute. Panicles 1–5 cm long, 0.5–1.3 cm wide, spiciform, linear, ovate to ovoid. Spikelets 3.5–4 mm long, lanceolate, laterally compressed; lemmas 1.2–1.5 mm long, 3-awned, central awns 3–4 mm long, geniculate, column twisted. Habitat: sandy soils. Distribution: (Mm, Ms) Mediterranean.

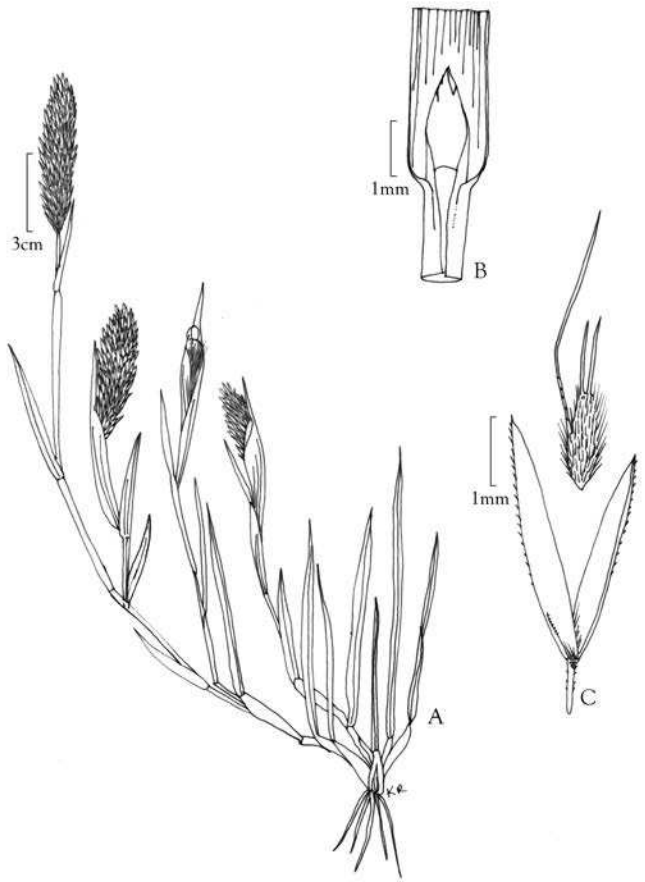


FIGURE 275. *Triplachne nitens.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and floret. A–C drawn from *R. Soreng & N. Soreng 3775* (US-3561051).

267. *Triraphis pumilio* R. Br.

FIGURE 276

Triraphis pumilio R. Br., Narr. Travels Africa 245. 1826.
Common name: *za'bal*.

Caespitose annuals. Culms 5–25 cm tall, erect, geniculate; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths flattened, hairy, margins sparsely hairy; oral hairs present; ligule a fringe of hairs; blades 3–8 cm long, 1–3 mm wide, linear, convolute, scabrous, margins scabrous, apex filiform. Panicles 0.6–8 cm long, 0.4–2 cm wide, spiciform, glomerate, oblong or ovate, exserted or partially included in the sheath. Spikelets 4–6 mm long, lanceolate, laterally compressed; lemmas 2–3 mm long, 3-awned, central awns 1.5–2.5 mm long. Habitat: wadi beds. Distribution: (Da, Ra, Ge) tropical Africa and Arabia.



FIGURE 276. *Triraphis pumilio*. A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *V. Täckholm, M. Kassas, M. Samy, M. Zahran & W. Girgis 287* (CAI); B, C drawn from *H. G. Schweickert 2242* (US-2461910).

268. *Trisetaria glumacea* (Boiss.) Maire

FIGURE 277

Trisetaria glumacea (Boiss.) Maire, Bull. Soc. Hist. Nat. Afr. Nord. 33: 93. 1942.

Caespitose annuals. Culms 5–15 cm tall, erect, geniculate; internodes glabrous, ribbed; nodes dark; butt sheaths glabrous, withering. Leaves basal and cauline; sheaths pubescent, margins smooth; ligules 1–2 mm long, a ciliate membrane; blades 6–7 cm long, 1–2 mm wide, lanceolate, flat, curly or straight, spreading, pilose on both sides, margins scabrous, apex acuminate. Panicles 2–5 cm long, 1–1.5 cm wide, contracted, lanceolate or oblong.

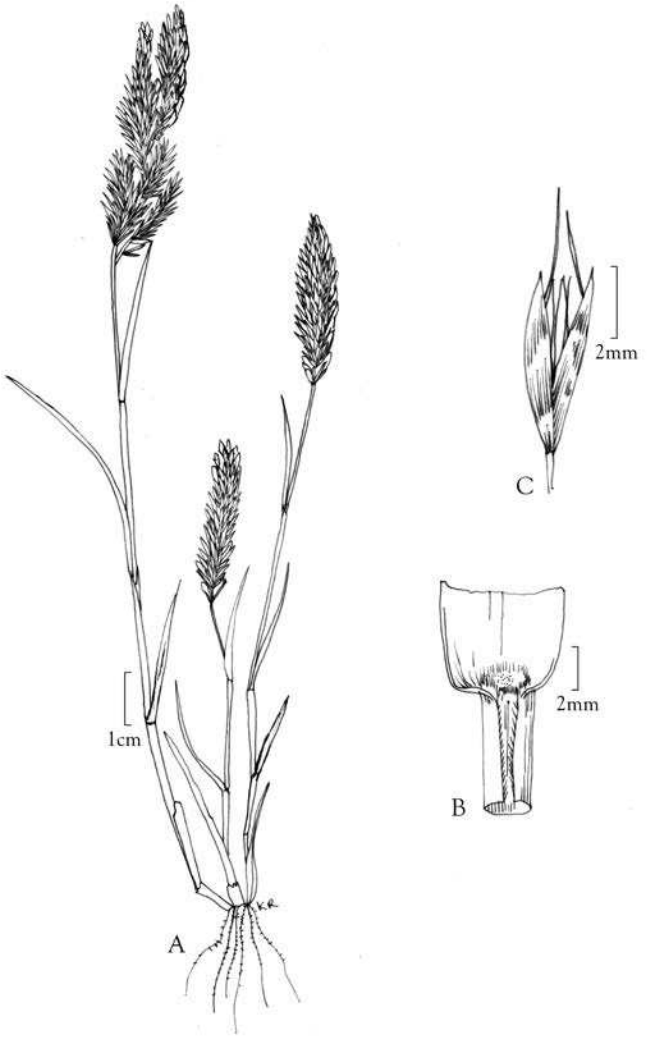


FIGURE 277. *Trisetaria glumacea.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A–C drawn from *G. Täckholm s.n.* (CAI).

Spikelets 4–5 mm long, cuneate, laterally compressed; lemmas 2–2.5 mm long, 3-awned, central awns 2.5–3 mm long, inserted below the middle, geniculate, column twisted column. Habitat: sandy soils and limestone rocks. Distribution: (Mm, Ms, Di) Syria and Palestine.

269. *Trisetaria koelerioides* (Bornm. & Hack.) Melderis

FIGURE 278

Trisetaria koelerioides (Bornm. & Hack.) Melderis, Ark. Bot., n.s., 2: 292. 1952.

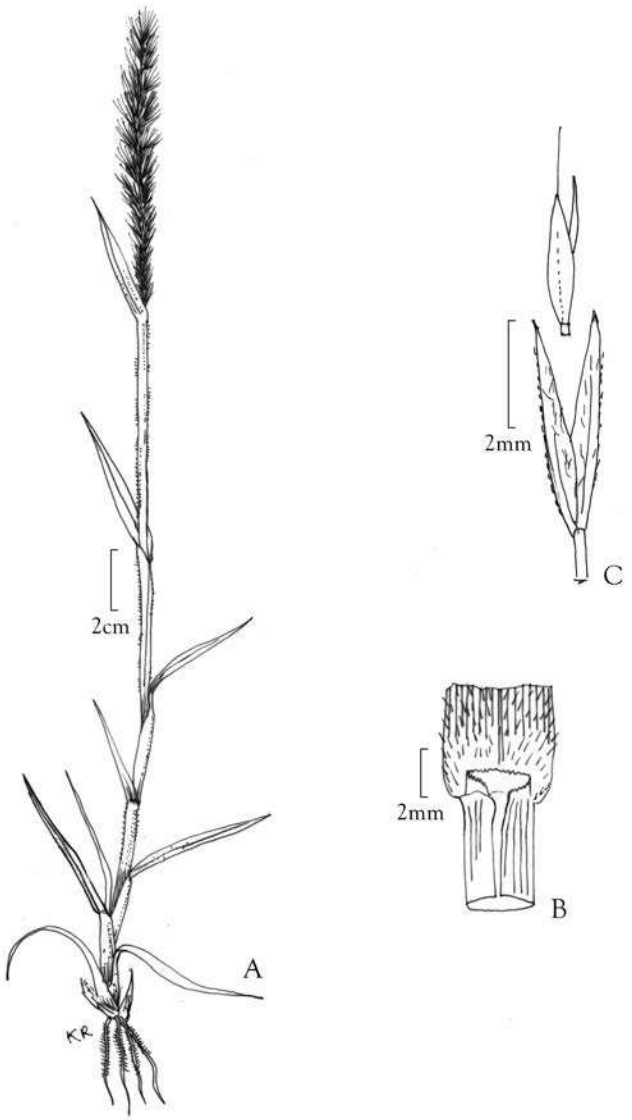


FIGURE 278. *Trisetaria koelerioides.* A. Habit. B. Ligule, sheath, and blade. C. Glumes and florets. A drawn from *L. Boulos 235* (CAI); B, C drawn from *J. Bornmuller 1654* (US-1109458).

Caespitose annuals. Culms 10–25 cm tall, erect, geniculate; internodes hirsute; butt sheaths sparsely hairy, withering. Leaves basal and cauline; sheaths hairy, margins hairy; oral hairs present; ligules 1–3 mm long, membranous, apex erose, serrate; blades 1–7 cm long, 1–2 mm wide, involute, spreading, hirsute, margins ciliate, apex acute. Panicles 4–8 cm long, 1–1.5 cm wide, spiciform, contracted, lanceolate or oblong, partially included in the sheath. Spikelets 6–7 mm long, cuneate, laterally compressed; lemmas 3.5–4 mm long, apex entire, mucronate or awned, the awns up to 2 mm long, geniculate, column twisted. Habitat: coastal sand. Distribution: (Ms) Syria, Palestine, and Lebanon.

270. *Trisetaria linearis* Forssk.

FIGURE 279

Trisetaria linearis Forssk., Fl. Aegypt.-Arab. 60. 1775.

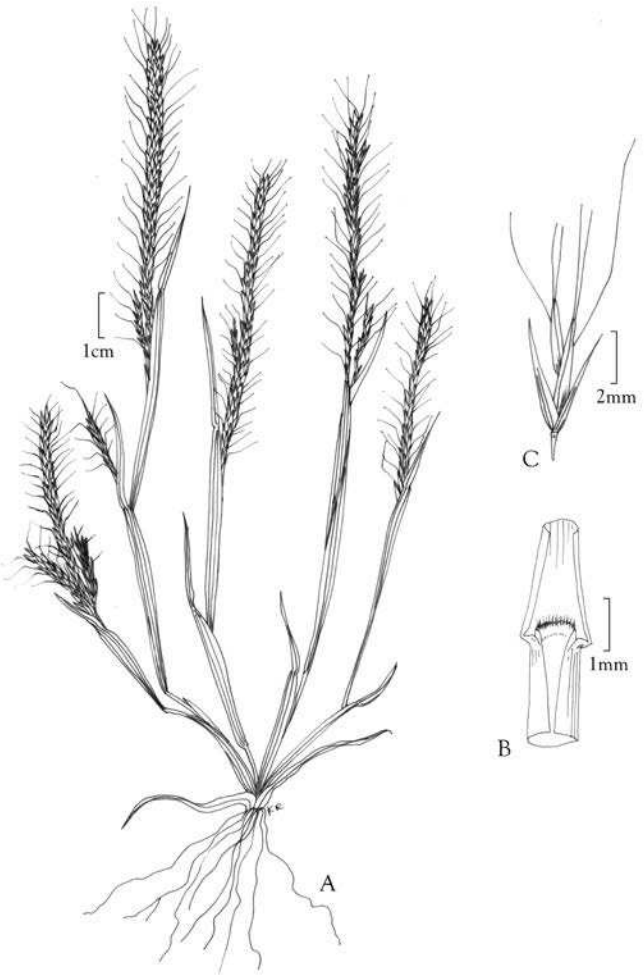


FIGURE 279. *Trisetaria linearis.* A. Habit. B. Ligule, sheath, and blade. C. Spikelet. A drawn from *M. Gibali 196* (CAI); B drawn from *L. Ehrenberg* (US-326084); C drawn from Cope (2005).

Caespitose annuals. Culms 10–30 cm tall, erect, geniculate, scabrous; butt sheaths woolly. Leaves basal and cauline; sheaths longer than blades, flattened, pubescent, margins hairy; ligules 1–3 mm long, membranous, apex erose; blades 1–7 m long, 1–2 mm wide, linear, conduplicate, spreading, pubescent, margins scabrous, apex acute. Panicles 5–10 cm long, 0.5–1 cm wide, spiciform, linear, subtended by an inflated leaf sheath. Spikelets 5–10 mm long, cuneate, laterally compressed; lemmas 3.5–7 mm long, 3-awned, central awns 8–10 mm long, geniculate, column twisted. Habitat: sandy dunes. Distribution: (Ms, Mp, Nv) N Africa and SW Asia.

271. *Trisetaria macrochaeta* (Boiss.) Maire

FIGURE 280

Trisetaria macrochaeta (Boiss.) Maire, Bull. Soc. Hist. Nat. Afrique N. 33(4): 92. 1942.

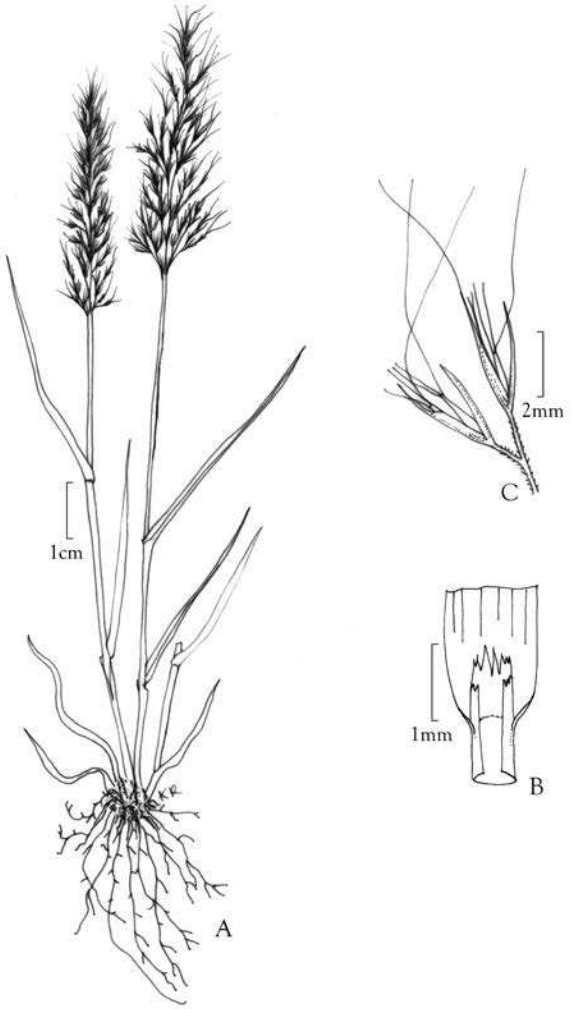


FIGURE 280. *Trisetaria macrochaeta.* A. Habit. B. Ligule, sheath, and blade. C. Two spikelets. A drawn from *K. Khalifa & N. Sherif 3911* (CAI); B, C drawn from *J. Bornmuller* (US-1109459).

Solitary annuals. Culms 10–20 cm tall, erect, geniculate; internodes hirsute; butt sheaths sparsely hairy, withering with age. Leaves basal and cauline; sheaths longer than the blades, glabrous, margins scabrous; oral hairs present; ligules 0.5–1 mm long, membranous, lacerate; blades 4–8 mm long, 1–2 mm wide, linear, convolute, spreading, midrib conspicuous, sparsely hairy, margins scabrous, apex acute. Panicles 1–7 cm long, 0.5–3.5 cm wide, contracted, included in the sheath; primary branches 0.5–3 cm long. Spikelets 3.5–4 mm long, cuneate, laterally compressed; glumes 0.5 mm long, 1-awned; lemmas 1.7–2.5 mm long, 3-awned, central awns 5–7 mm long, geniculate, column twisted. Habitat: sandy and rocky ground. Distribution: (Nv, Da, Di) Palestine, Libya, and Spain.

272. *Triticum aestivum** L. subsp. *aestivum*

FIGURE 281

*Triticum aestivum** L., Sp. Pl. 1: 85. 1753.
Common names: *qamh hindi, qamh taliani*; bread wheat.

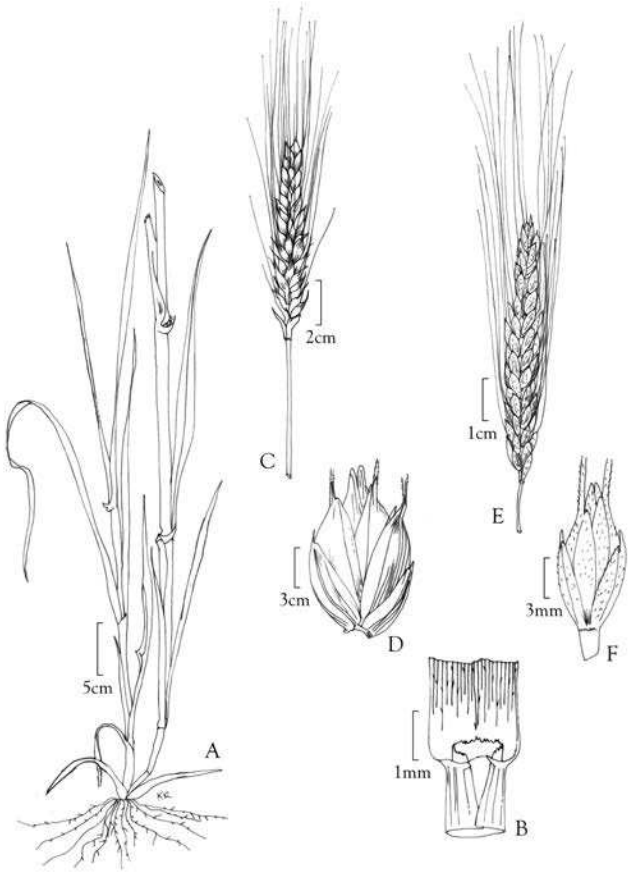


FIGURE 281. *Triticum aestivum.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelet. A–C modified from Hitchcock (1951); D drawn from *L. B. Smith s.n.* (US-1963579). *Triticum dicoccum.* E. Inflorescence. F. Spikelet. E, F modified from Morrison (2007).

Caespitose annuals. Culms 60–100 cm tall, erect, geniculate; internodes glabrous; nodes bearded; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins smooth; auricles clawlike; collars dark; ligules 1–3 mm long, membranous, apex truncate; blades 10–60 cm long, 10–15 mm wide, linear; flat; spreading, sparsely hairy, margins scabrous, apex acute. Inflorescence a single, bilateral spike; spikes 5–18 cm long, linear or oblong. Spikelets 10–15 mm long, 9–18 mm wide, ovate, laterally compressed; glumes 6–12 mm long; lemmas 10–15 mm long, unawned or awned, the awns up to 15 cm long, straight, bristly. Habitat: cultivated cereal. Distribution: (Mm, Nv, Di, Ol) throughout the world.

273. *Triticum dicoccum** Schrank ex Schübl.

FIGURE 281

*Triticum dicoccum** Schrank ex Schübl., Diss. Char. Descr. Cereal 29. 1818. [*Triticum aestivum* L. subsp. *dicoccum* (Schrank ex Schübl.) Thell.]
Common name: emmer wheat.

Caespitose annuals. Culms up to 180 cm long, erect, geniculate; internodes glabrous or pubescent at nodes, thick walled or solid throughout; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins hairy; auricles clawlike; oral hairs present; ligules 1–3 mm long, membranous, apex erose, truncate; blades 30–60 cm long, 10–20 mm wide, linear, flat, spreading, scaberulous, margins scabrous, apex acuminate. Inflorescence a single, bilateral spike; spikes 3–10 cm long, 10–13 mm wide. Spikelets 9–12 mm long, laterally compressed, oblong, laterally compressed; glumes 6–10 mm long; lemmas 9–12 mm long, awned, the awns 10–15 cm long, straight, bristly. Habitat: cultivated cereal. Distribution: (Mm, Nv, Di, Ol) S and E Europe, temperate Asia.

274. *Triticum durum** Desf.

FIGURE 282

*Triticum durum** Desf., Fl. Atlant. 1: 114. 1798.
Common names: *qamh dakar*; durum wheat.

Caespitose annuals. Culms up to 150 cm tall, thick walled, sometimes solid, erect, geniculate below; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; auricles clawlike; collar dark; ligules 1–3 mm long, membranous, apex truncate; blades 10–60 cm long, 10–15 mm wide, linear, flat, spreading, sparsely hairy or glabrous, margins entire, apex acute. Inflorescence a single, bilateral spike; spikes 4–11 cm long. Spikelets 10–15 mm long, 8–15 mm wide, oblong, laterally compressed; glumes 8–12 mm long; lemmas 10–12 mm long, awned, the awns 8–15 cm long, straight, bristly. Habitat: cultivated cereal. Distribution: (Mm, Nv, Nn) Europe and temperate Asia.

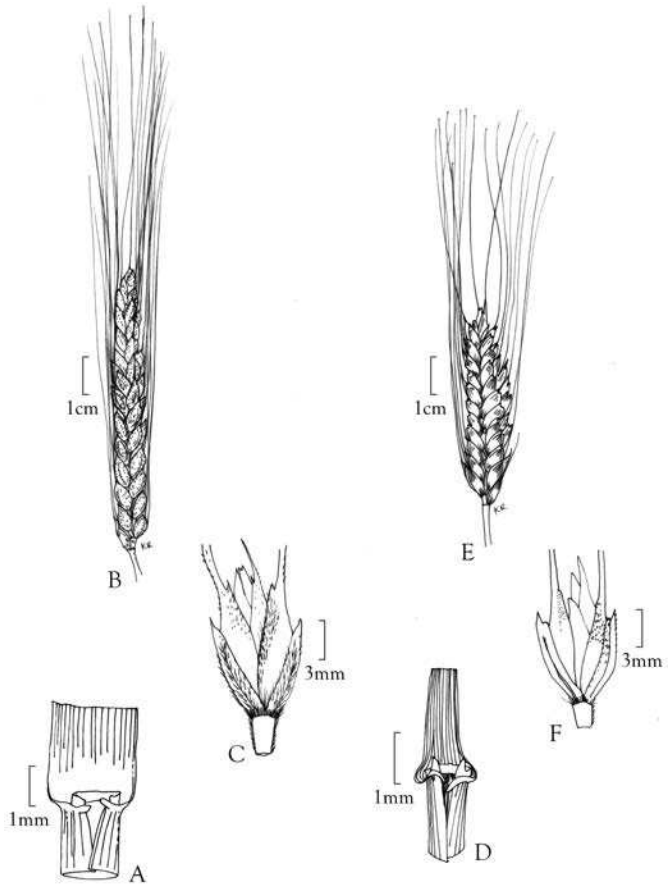


FIGURE 282. *Triticum turgidum.* A. Ligule, sheath, and blade. B. Inflorescence. C. Spikelet. A drawn from *J. Pfund* (US-805902); B, C modified from Morrison (2007). *Triticum durum.* D. Ligule, sheath, and blade. E. Inflorescence. F. Spikelet. D drawn from *H. G. Tedd s.n.* (US-1815398); E, F modified from Morrison (2007).

275. *Triticum pyramidale* Percival

FIGURE 283

Triticum pyramidale Percival, Wheat Pl. Monogr. 156, 262, f. 161–162. 1921.
Common name: *qamh baladi*.

Caespitose annuals. Culms up to100 cm tall, thick walled, sometimes solid, erect, geniculate; internodes glabrous; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, margins membranous; auricles clawlike; collars dark; ligules 1–3 mm long, membranous, apex truncate; blades 10–60 cm long, 10–15 mm wide, linear, flat, spreading, glabrous to sparsely hairy, hairy when young, margins entire, apex acute. Inflorescence a single, bilateral spike; spikes 4.5–6 cm long,



FIGURE 283. *Triticum pyramidale.* A. Habit. B. Spikelet. C. Floret and caryopsis. A–C modified from Raffeneau-Delile (1813).

pyramidal. Spikelets 10–15 mm long, 8–15 mm wide, oblong, laterally compressed; glumes 8–10 mm long; lemmas 10–12 mm long, awned, the awns 9–17 cm long, straight, scabrid. Habitat: cultivated cereal. Distribution: (Mm, Nv) Egypt and Ethiopia.

276. *Triticum turgidum** L.

FIGURE 282

*Triticum turgidum** L., Sp. Pl. 1: 86. 1753.
Common names: *fino, saba' rus*; durum wheat.

Caespitose annuals. Culms 90–150 cm tall, thick walled and sometimes solid, erect, geniculate below; internodes glabrous; butt sheaths glabrous. Leaves basal and cauline; sheaths glabrous, ribbed, margins membranous; oral hairs present; auricles clawlike; ligules 1–3 mm long, membranous, apex truncate; blades 10–60 cm long, 10–15 mm wide, linear, flat, spreading, pubescent, margins scabrous, bases amplexicaul, apex acute. Inflorescence a single, bilateral spike; spikes 7–10 mm long, oblong or ovate. Spikelets 10–13 mm long, 8–15 mm wide, packed broadside to the rachis, persistent; glumes 8–11 mm long; lemmas 10–13 mm long, awned, the awns 8–16 cm long, straight, bristly. Habitat: cultivated cereal. Distribution: (Nv, Nn) Mediterranean region, C Asia, Siberia, S. Africa, Australia, and America.

277. *Urochloa deflexa* (Schumach.) H. Scholz

FIGURE 284

Urochloa deflexa (Schumach.) H. Scholz, Bull. Mus. Natl. Hist. Nat., B, Adansonia, s*ér. 4, 11(4): 443. 1990*. [*Brachiaria deflexa* (Schumach) C. E. Hubb. ex Robyns.]
Common names: *belleib*, *rokeib*, *yadaab*; annual brachiaria.

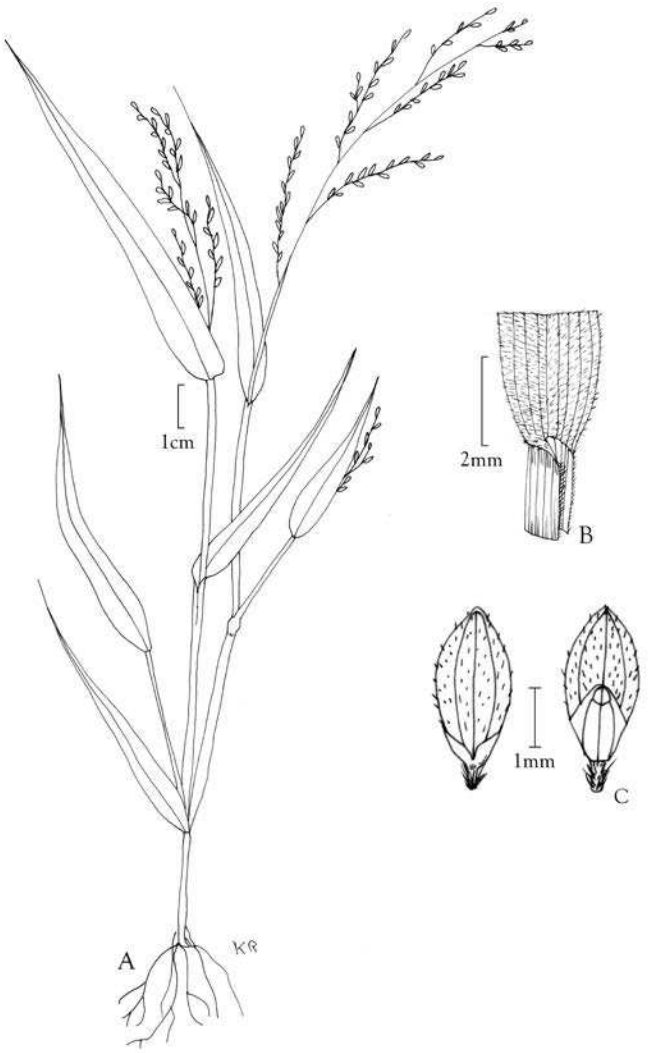


FIGURE 284. *Urochloa deflexa.* A. Habit. B. Ligule, sheath, and blade. C. Spikelets with lower glume (left) and upper glume (right). A modified from Ibrahim and Kabuye (1988); B, C drawn from *R. Tanner 2021* (US-2473041), *A. Stolz 1818* (US-1163363).

Caespitose annuals. Culms 15–35 cm tall, erect, often weak, ascending; internodes glabrous; butt sheaths glabrous. Leaves mostly cauline; sheaths hairy, margins hairy; ligules 1 mm long, a fringe of hairs; blades 2–10 cm long, 2–4 mm wide, broadly linear-lanceolate, flat, ascending, sparsely hairy, margins ciliate, apex acute. Panicles 6–15 cm long, terminal, composed of 7–15 racemes borne along a central axis, unilateral; racemes 0.5–2.5 cm long; rachis wingless, angular. Spikelets 2.5–3.5 cm long, in pairs, elliptic, dorsally compressed, apex acute; lower glumes ⅓ to ½ as long as the spikelet; upper lemmas rugose, awnless. Habitat: sandy wadis and seashores. Distribution: (De, Ra, Rq, Rz, Ge) tropical and S Africa, India.

278. *Urochloa leersioides* (Hochst.) H. Scholz & Valdés

FIGURE 285

Urochloa leersioides (Hochst.) H. Scholz & Valdés, Willdenowia 36(2): 663. 2006. [*Brachiaria leersioides* (Hochst.) Stapf.]
Common name: blue signal grass.

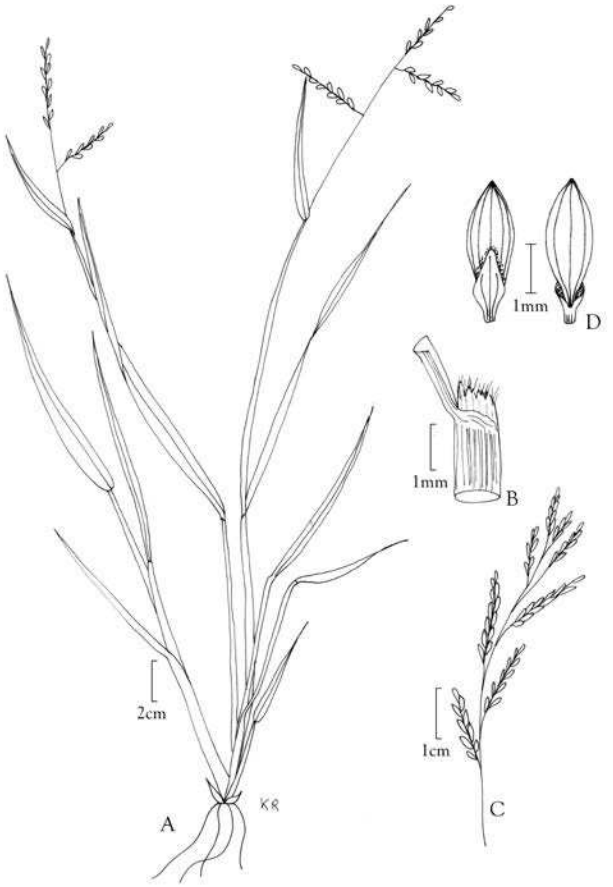


FIGURE 285. *Urochloa leersioides.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Spikelets with upper (right) and lower (left) glumes. A, C modified from Ibrahim and Kabuye (1988); B drawn from *V. Täckholm 119* (CAI); D modified from Cope (2005).

Caespitose annuals. Culms 15–70 cm tall, erect, geniculate; internodes pubescent; butt sheaths sparingly hairy. Leaves mostly cauline; sheaths longer than blades, pilose, margins hairy; ligules 1–3 mm long, a ciliolate membrane; blades 2–20 cm long, 2–5 mm wide, linear, flat, spreading, glabrous, margins smooth, apex attenuate, filiform. Panicles 3–20 cm long with 3–14 racemes borne along a central axis; racemes 1–7 cm long, deflexed or spreading, unilateral; rachis wingless, angular. Spikelets 2–3.5 mm long, in pairs, elliptic, dorsally compressed, apex subacute; lower glumes ⅓ to ½ as long as spikelet; upper lemmas coarsely rugose, awnless. Habitat: sandy wadis. Distribution: (Ge) tropical Africa and Arabia.

279. *Urochloa mutica* (Forssk.) T. Q. Nguyen

FIGURE 286

Urochloa mutica (Forssk.) T. Q. Nguyen, Novosti Sist. Vyssh. Rast. 1966: 13. 1966. [*Brachiaria mutica* (Forssk.) Stapf.]

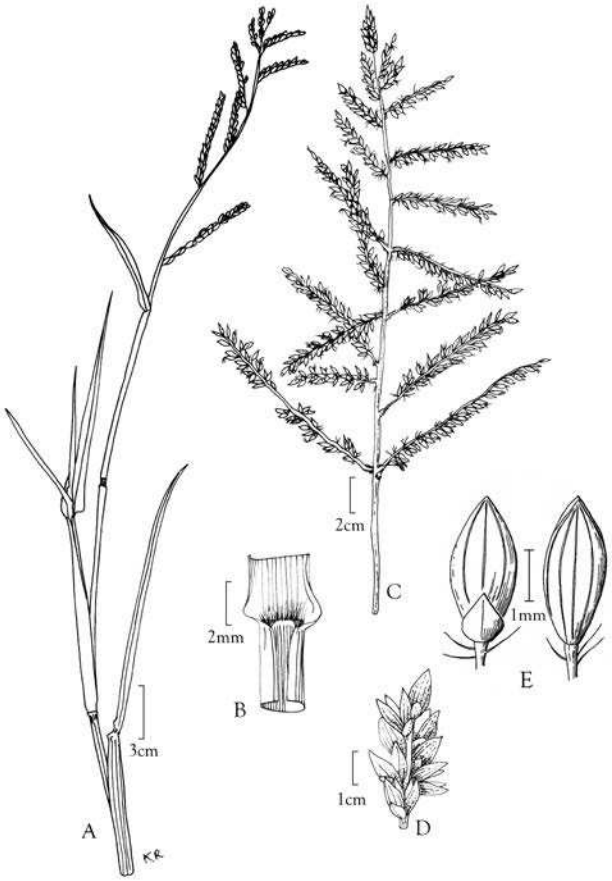


FIGURE 286. *Urochloa mutica.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Segment of inflorescence. E. Spikelets showing lower (left) and upper (right) glumes. A drawn from *A. Amer 15425* (CAI); B–D drawn from *G. Schweinfurth s.n.* (US-823874), *C. Mez* (US-1649625); E modified from Wipff and Thompson (2003a).

Common names: *adar hamoreit*, *ausiba*, *hashish rukeb*, *moddeid*, *rukeiba*; para grass.

Caespitose perennials. Culms 25–130 cm tall, erect, geniculate, rooting at lower nodes; internodes glabrous, straw colored; nodes swollen; butt sheaths glabrous. Leaves mostly cauline; sheaths longer than blades, hairy, margins glabrous; ligules 1–3 mm long, a fringe of hairs; blades 5–20 cm long, 5–6 mm wide, broadly linear, flat, spreading, sparingly hairy, margins wavy, ciliate, apex acute. Panicles 7–20 cm long with 5–20 racemes borne along a central axis; racemes 2–10 cm long, unilateral, simple or secondarily branched; rachis broadly winged, margins scabrous. Spikelets 2.5–3.5 mm long, elliptic, dorsally compressed, apex acute; lower glumes ¼ to ⅓ as long as spikelet; upper lemmas rugulose, awnless. Habitat: canal banks and ditches. Distribution: (Mm, Ms, Nv) tropics.

280. *Urochloa panicoides** P. Beauv.

FIGURE 287

*Urochloa panicoides** P. Beauv., Ess. Agrostogr. 53, pl. 11, f. 1. 1812.
Common names: *nesila*; liverseed grass.

Caespitose annuals. Culms 60–100 cm tall, erect, geniculate; internodes glabrous; often lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths sparsely hairy, margins hairy; oral hairs present; ligule a fringe of hairs; blades 2–25 cm long, 5–15 mm wide, linear, flat, spreading, glabrous, margins tuberculate-ciliate, bases amplexicaul, apex acute. Panicles 1–9 cm long with 2–7(–10) racemes borne along a central axis; racemes 1–7 cm long, unilateral; rachis narrowly winged. Spikelets (2.5–)3.5–4.5(–5.5) mm long, elliptic, dorsally compressed, plano-convex, apex acute; lower glumes ¼ to ½ as long as spikelet; upper lemmas rugulose, apex mucronate, the mucro 0.3–1 mm long. Habitat: weed of cultivation. Distribution: (Nv) tropical E Africa, S Africa, Arabia, and India.

281. *Urochloa ramosa* (L.) T. Q. Nguyen

FIGURE 288

Urochloa ramosa (L.) T. Q. Nguyen, Novosti Sist. Vyssh. Rast. 1966: 13. 1966. [*Brachiaria ramosa* (L.) Stapf.]
Common names: *bilbil, yadab*; browntop millet.

Caespitose annuals. Culms 7–50 cm tall, decumbent; internodes glabrous; butt sheaths glabrous. Leaves mostly cauline; sheaths longer than adjacent internodes, glabrous, margins glabrous; ligules 1 mm long, a fringe of hairs; blades 2–10 cm long, 2–4 mm wide, lanceolate, flat, ascending, sparingly hairy, margins ciliate, apex acute. Panicles 3–10 cm long with 3–15 racemes borne along a central axis; racemes 1–8 cm long, unilateral, simple or branched at base; rachis wingless, angular. Spikelets 2.5–3.5 mm long, in pairs, elliptic, dorsally compressed, apex acute or cuspidate; lower glumes ⅓ to ½ as long as spikelet; upper lemmas rugose, awnless. Habitat: moist sandy soils. Distribution: (Ge) tropical Asia and S Africa.

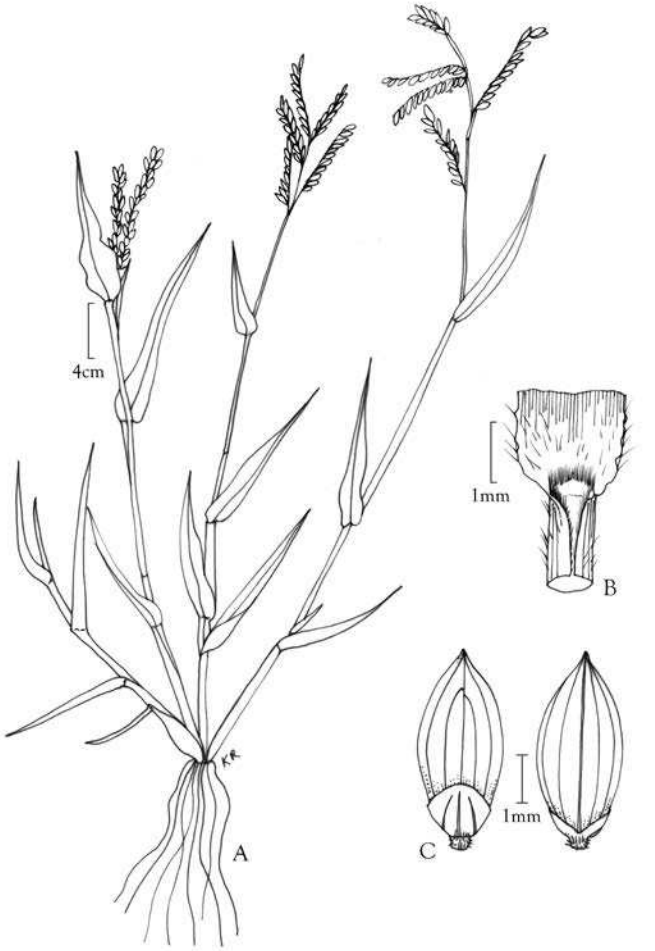


FIGURE 287. *Urochloa panicoides*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets with upper (right) and lower (left) glumes. A drawn from *B. Promän 3940* (CAI); B, C drawn from *R. Stony s.n.* (US-3193073).

282. *Urochloa reptans** (L.) Stapf

FIGURE 289

*Urochloa reptans** (L.) Stapf, Fl. Trop. Afr. 9: 601. 1920. [*Brachiaria reptans* (L.) C. A. Gardner & C. E. Hubb.]
Common names: *nissiela*; running grass.

Caespitose annuals. Culms 10–50 cm tall, decumbent, rooting at lower nodes; internodes glabrous, striate; nodes dark; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than

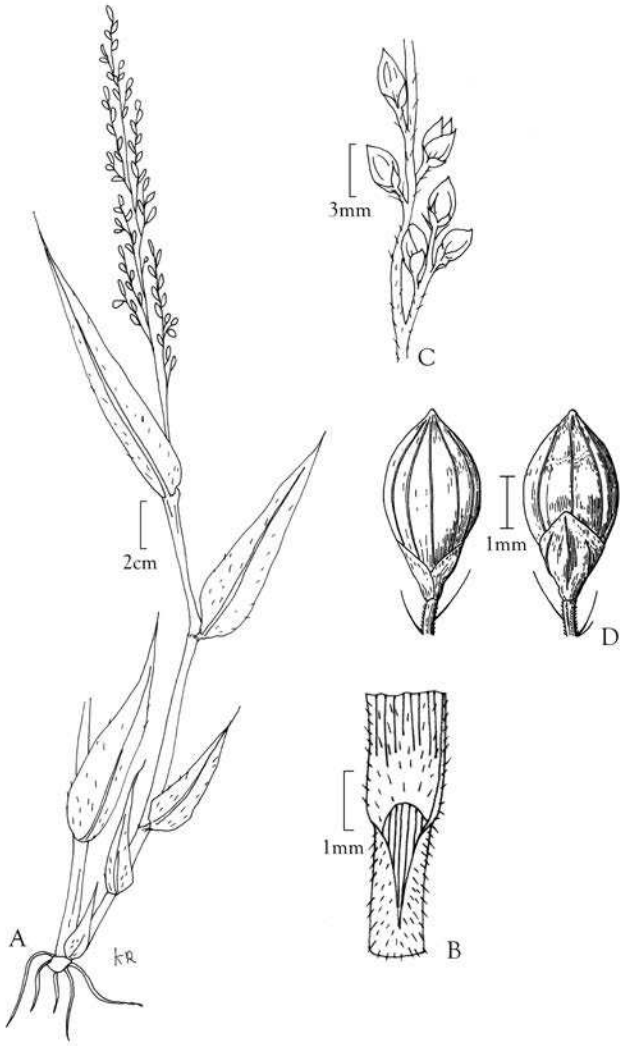


FIGURE 288. *Urochloa ramosa*. A. Habit. B. Ligule, sheath, and blade. C. Segment of inflorescence. D. Spikelets showing (upper) and (lower) glumes. A, C modified from Ibrahim and Kabuye (1988); B, D drawn from *A. P. G. Mickelmore* (US-2975886).

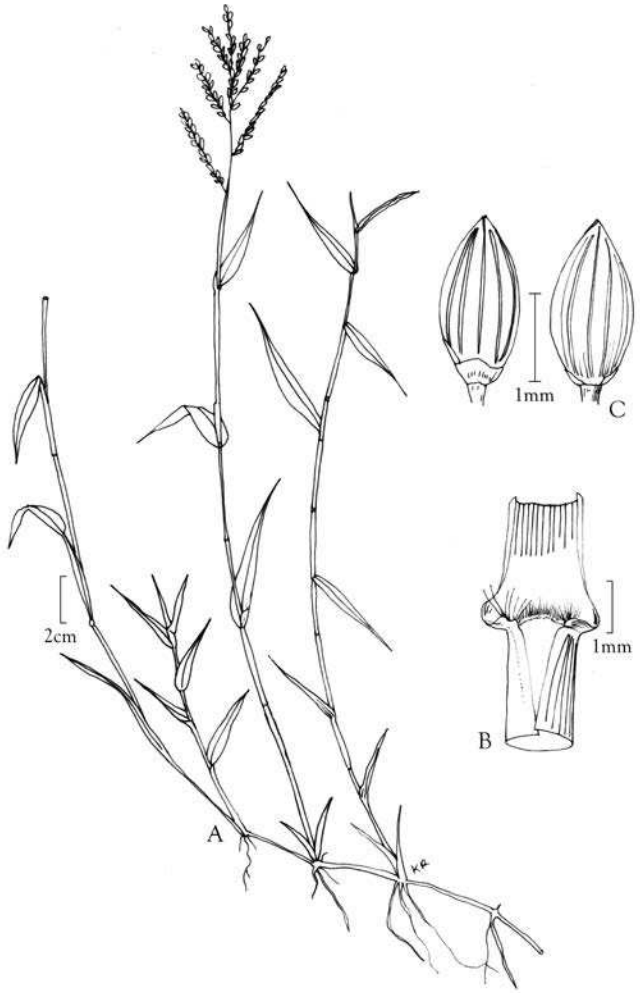


FIGURE 289. *Urochloa reptans*. A. Habit. B. Ligule, sheath, and blade. C. Spikelets with upper (right) and lower (left) glumes. A drawn from *A. Amer 13037* (CAI); B, C drawn from *T. E. Vaughan* (US-1271777).

adjacent internodes, glabrous, margins smooth; ligules 1 mm long, a fringe of hairs; blades 2.5–6 cm long, 3–10 mm wide, lanceolate, flat, ascending, glabrous, margins ciliate, wavy, bases cordate, apex acute. Panicles 1–8 cm long with 5–15 racemes borne along a central axis; racemes 1–4 cm long, unilateral; rachis wingless, angular. Spikelets 1.5–2.2 mm, crowded, regular, 2-rowed, elliptic or oblong, dorsally compressed, apex acute; lower glumes ¼ as long as spikelet; uppers lemmas rugose, apex acute to mucronate, awnless. Habitat: weed in cultivated and waste ground. Distribution: (Ms, Nv, Da) tropical Asia, Arabia, and tropical Africa.

283. *Vossia cuspidata* (Roxb.) Griff.

FIGURE 290

Vossia cuspidata (Roxb.) Griff., Not. Pl. Asiat. 3, Index 12. 1851.

Common name: hippo grass.

Aquatic, spongy perennial with elongated rhizomes and fibrous roots. Culms up to 200 cm tall, out of water, erect, geniculate; internodes glabrous; nodes dark, lower nodes rooting; butt sheaths glabrous. Leaves basal and cauline; sheaths longer than adjacent internodes, flattened, glabrous, margins smooth; ligules 1–3 mm long, a ciliolate membrane; blades 30–100 cm long, 5–20 mm wide, linear, flat, spreading, scabrous, margins

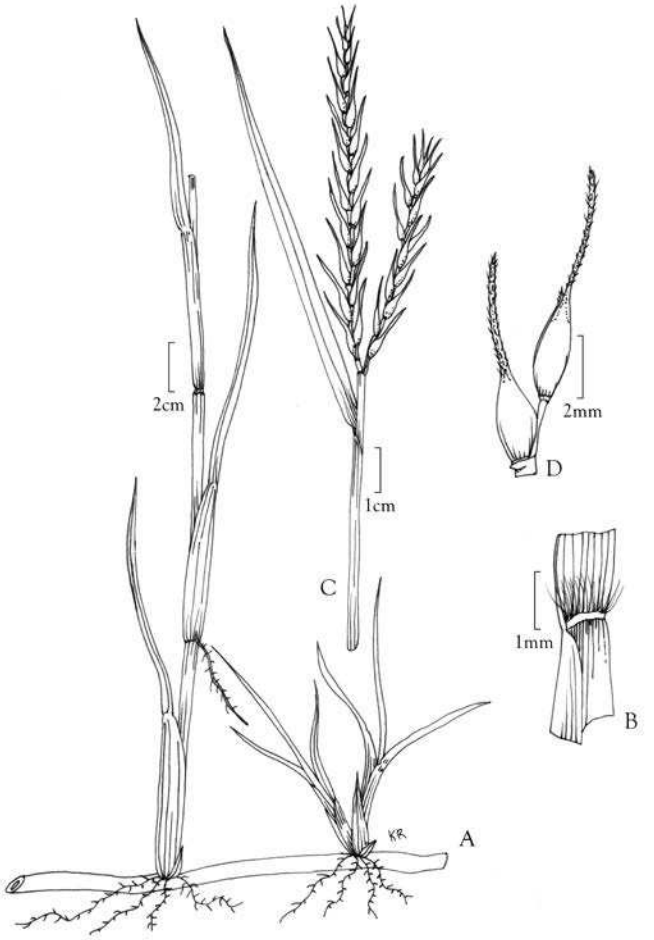


FIGURE 290. *Vossia cuspidata.* A. Habit. B. Ligule, sheath, and blade. C. Inflorescence. D. Two spikelets. A, D drawn from *Al Gadi 5* (CAI); B drawn from *Juniper & Jefford* 39 (US-2473200); C modified from Ibrahim and Kabuye (1988).

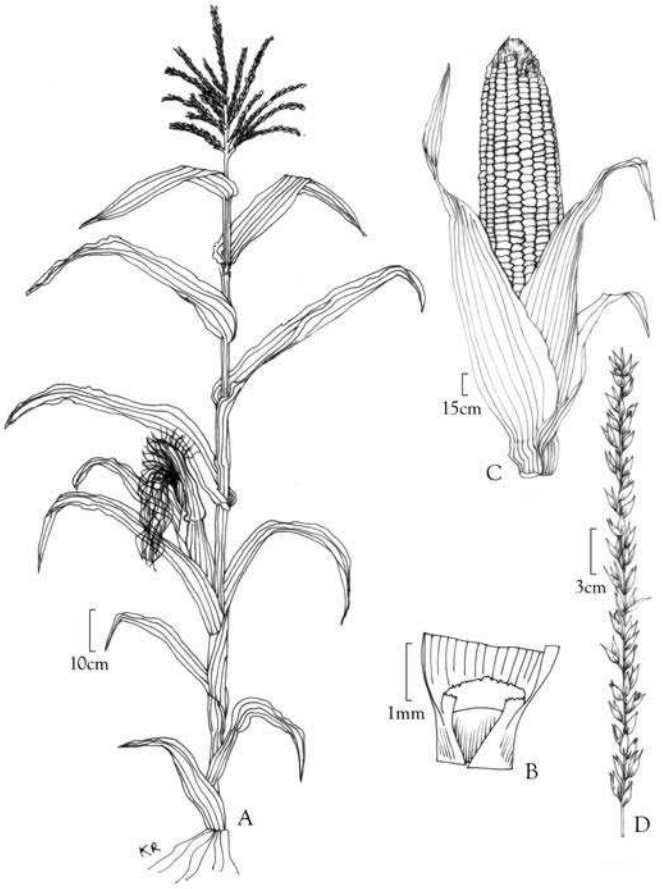


FIGURE 291. *Zea mays.* A. Habit. B. Ligule, sheath, and blade. C. Female raceme. D. Male raceme. A drawn from *El Hadidi s.n.* (CAI); B drawn from *A. S. Hitchcock s.n.* (US-727090); C unknown (US-727092); D drawn from *A. Asima 421* (US-2208997).

scabrous, apex attenuate. Inflorescence with 1–12 digitately inserted racemes; racemes 10–30 cm long. Spikelets 20–40 cm long, in pairs, ovate, dorsally compressed; lower glumes with a long caudate apex; lemmas awnless. Habitat: water courses. Distribution: (Nv, Nn) tropical Africa and India.

284. *Zea mays** L.

FIGURE 291

*Zea mays** L., Sp. Pl. 2: 971–972. 1753.
Common names: *durra kizan, durra shami*; corn, maize.

Robust annuals with stilt roots; plants monoecious. Culms 2–3(–5) m tall, erect, 1–5 cm thick; internodes solid, ridged, semiterete, glabrous; butt sheaths glabrous. Leaves cauline; sheaths longer than adjacent internodes, glabrous, ribbed, margins sparsely hairy; ligules 1–2 mm long, membranous, apex erose or lacerate; blades 30–100 cm long, 2.5–10 cm wide, flat, drooping, hairy on basal ⅓, margins pubescent, bases cordate, apex acuminate. Female inflorescence axillary, subtended by 1 or more elliptic herbaceous spatheoles (sheaths), a cylindrical spike, 1–5(–10) cm thick with 2 or more rows of paired spikelets; male inflorescence terminal, paniculate; lemmas awnless. Habitat: a cultivated crop or as introduced weed. Distribution: (Nv, Nn) tropics and subtropics, originally from Mexico.

KEY TO THE SUBSPECIES

1a. Female inflorescences 2–5(–10) cm thick with 8–24 rows of spikelet pairs forming a thick woody cob, all tightly enclosed by several leafy spatheoles . . . . . ***Z. mays* subsp. *mays***

1b. Female inflorescences less than 1 cm thick with 2 rows of spikelet pairs forming a hardened rachis, all enclosed by a single leafy spatheole . . . . . ***Z. mays* subsp. *mexicana* (Schrad.) Iltis, Phytologia 23(2): 249. 1972**

FIGURE 292

Common name: Mexican teosinte.

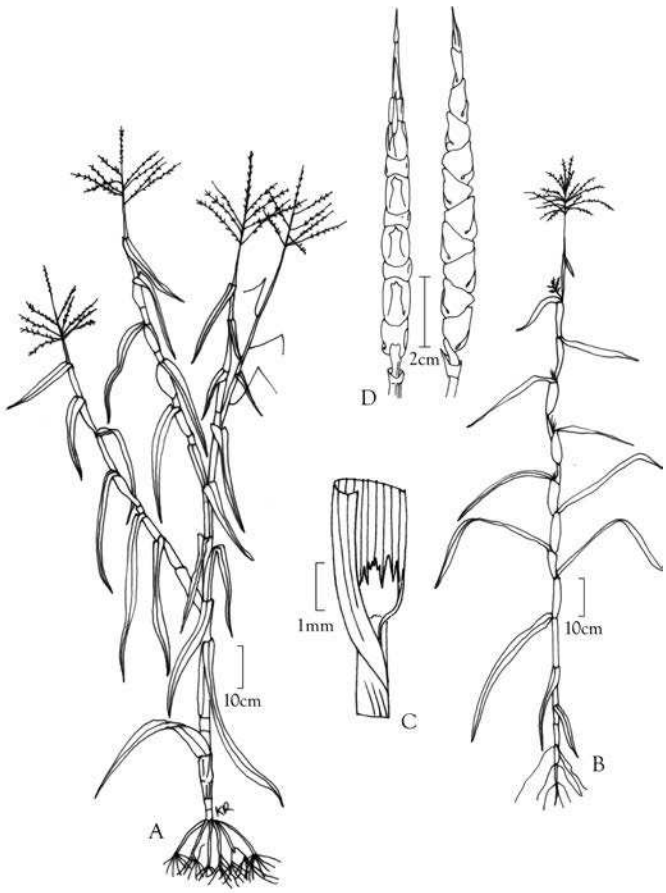


FIGURE 292. *Zea mays* subsp. *mexicana*. A, B. Habit. C. Ligule, sheath, and blade. D. Pistillate racemes. A, B drawn from *G. Gandara s.n.* (US-1763492); C drawn from *L. Lundell* (US-2304203); D drawn from *Palmer 743* (US-740001).

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 bristlelike appendage ending in an organ, borne on the glume or lemma of grasses.
axil. The upper angle between a stem and its branch (or leaf).
axillary. Used in reference to structures attached in the axil.
axis. The main stem or culm, especially of an inflorescence.
barbed. With rigid points or short bristles pointing backward.
basal. At or toward the base. Opposite: apical.
bearded. With long or stiff hairs.
biennial. Taking two years of growth from seedling to maturity, usually producing only vegetative growth in the first season and flowering in the second.
bifid. Two clefts or two lobes at the tip; deeply divided into two parts.
bilateral. Two-sided, usually referring to the placement of spikelets along two sides of a branch.

bilobed. With two lobes at the tip of a lemma found in *Schismus*.
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 cartilage.
caryopsis. A one-seeded, dry, indehiscent fruit with the seed coat adherent to the fruit wall; the grain of most grasses.
cataphyll. A scale leaf, usually on a rhizome at the base of the plant.
caudate spikelet. Having a narrow, taillike appendage, used to describe the long, linear, flattened apex of the lower glume in *Vossia*.
caudices. Short, thickened, verticillate or branched stems, 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 of small constituent inflorescences (as in some Andropogoneae) 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 *Cenchrus*.
fascicle. A fairly tight cluster.
fascicles. Spikelike panicles of highly reduced branches forming a "bur" in *Cenchrus* and cluster of bristles in *Setaria*.
fasciculate. Leaves or branches in a cluster or tight bundle.
fastigiate branching. Branches or culms clustered or arising from a single point in a broom-like appearance; see *Elionurus royleanus*.
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.
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 tribe Andropogoneae, 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 footstalk or peduncle.
perennial. A plant living for more than two years.
perfect. A floret (flower) with functional stamens and pistil.
persistent. Remaining attached, not falling off.
petiole. The stalk of a leaf blade.
pilose. Covered with loose, soft, long, straight hairs, not dense but somewhat shaggy.
pit glands. Small glandular depressions common on some species of *Eragrostis*.
plane. Level, flat surface.
pleated. Folded; see plicate.
plicate. Folded 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 tribe Andropogoneae 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, bristlelike.

setose. Bristly, beset with bristles.

sheath. A more or less tubular structure surrounding an organ or part, as the lower part of a grass leaf that wraps around the stem.

silky. A condition produced by a cover of soft, long, straight, fine hairs.

simple. Composed of not more than one anatomically or morphologically identical unit; not compound.

sinuous. Strongly wavy. Compare: undulate.

sinus. The notch between two lobes of a leaf or apex of a lemma.

slender. Slim, thin.

smooth. Referring to surfaces that are not rough, sometimes loosely used for the absence of hairs.

solitary. Borne singly or alone.

spathe. A leafy bract (in grasses formed by the sheath) that supports the branches of a spatheate inflorescence.

spatheate. With spathes or spatheoles.

spatheolate. Having spatheoles.

spatheole. A leafy bract (spathe) enclosing part of an inflorescence. In grasses the leafy bract is usually the sheath.

spatulate. Spoon or spatula shaped.

spicate. With spikes, spikelike, or disposed in a spike.

spiciform. Spikelike, in the form of a spike.

spike. An inflorescence or branch with sessile spikelets on an axis; spikes may be solitary, digitate, or scattered.

spikelet. The unit of the inflorescence in grasses, consisting of two glumes and one or more florets; a diminutive of spike.

spine. A hard, sharp-pointed structure, often long and narrow.

spinose. Spiny or 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.
utricle. A small bladder-like one-seeded indehiscent fruit used to describe the globose-ovoid, bony, shining structure enclosing the one-flowered spikelet of *Coix lacryma-jobi*.
vein. A strand of vascular tissue (a vascular bundle) usually found in leaves, glumes, lemmas, and paleae.
venation. The arrangement of the vascular bundles or veins in a leaf.
vernal. Occurring in the spring.
verrucose. Having a wartlike or nodular surface.
verticillate. Arranged in whorls.
villous. Densely covered with long, weak, silky, often curly hairs.
viscid. Sticky or 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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