

A REVISED TAXONOMY OF THE GRASSES.¹

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Having had occasion to study the grass flora of Ohio in connection with the preparation of a forthcoming catalog of Ohio plants and having paid considerable attention to the phyletic arrangement of the flowering plants, it soon became evident to the writer that the usual arrangement, as given in recent systematic works, reverses the order of nature and the rational method of presentation. To begin the grass series with plants having such specialized structures as one finds in *Zea*, *Coix*, and *Tripsacum*, is to intimate that the grasses have been evolving from the specialized to the unspecialized, from the unique to the normal, from the particular to the general.

If one makes a general study of the spikelet and flower, the order of progress is indicated in a remarkably clear manner by a long series of degenerations and vestigial parts. The evidence is incontrovertable to anyone who can entertain any modern views on the doctrine of evolution as applied to these plants. The conclusion seems inevitable—the bamboos and arundinarias are the most primitive grasses while gama-grass, Job's-tears, and Indian corn are among the most extreme specializations to be found not alone in the Gramineae but even in the whole group of flowering plants.

In order to present the arrangement clearly to students of systematic botany, a brief description of the terminology, with a synopsis of the tribes usually recognized and a systematic list of the local genera, is given below.

TERMINOLOGY OF THE GRASS INFLORESCENCE

The inflorescence of a grass is made up of compact flower-bearing branchlets known as spikelets. In general, the spikelet of a grass is of the same importance in identification as the flower in most other groups. The spikelet usually has two bracts at the base which are called the *empty glumes*. These may be distinguished as the *outer* and *inner empty glumes*. Each flower is also normally inclosed in two bracts, called the *flowering glumes*. The outer of these glumes is called the *lemma* the inner the *palet*. All of these bracts can thus be called *glumes* collectively. Through reduction of the spikelet and degeneration of the flower, part of the glumes may be absent or vestigial, or extra glumes may be present. Usually there are 2 (sometimes 3) minute bracts or scales at the base of the flower, within the flowering glumes. These

¹ Contributions from the Botanical Laboratory of Ohio State University, 67.

are called *lodicules* and are supposed to represent a vestigial perianth.

The synopsis given below corresponds quite closely with that of Bessey, given in his "Outline of Plant Phyla, Second Edition." I might add however, that my own arrangement was worked out independently several years ago before I knew that Dr. Bessey was working on the same problem. To anyone interested, a comparison of the two synopses will indicate in some degree the basis on which phyletic classification rests and the extent of agreement to be attained by workers not influenced by nor following any adopted "authority."

SYNOPSIS OF THE TRIBES OF GRASSES.

- I. Spikelets many—1-flowered; rachilla usually articulated above the empty glumes which are persistent after the fall of the flowers; spikelets usually more or less laterally compressed.
1. Aerial stems entirely woody or at least woody at the base, perennial; lodicules usually 3; leaf-blade with a short petiole articulated with the sheath.
Subfamily, **Bambusatae**.
a. Tribe, *Bambuseae*.
 2. Aerial stems herbaceous and annual; lodicules usually 2; leaf-blades sessile, without a joint.
Subfamily, **Poacatae**.
 - (1). Spikelets 2—many-flowered; in panicles, spike-like panicles or racemes.
 - a. Flowering glumes as long or longer than the empty glumes, unawned or with a straight awn from the apex. Tribe, *Festuceae*.
 - b. Flowering glumes generally shorter than the empty glumes, usually with a bent awn on the back; callus and usually the rachilla-joints hairy. Tribe, *Aveneae*.
 - (2). Spikelets 1—several-flowered, in rows, forming an equilateral or 1-sided spike or raceme; sometimes monosporangiate.
 - a. Spikelets sessile in 2 opposite rows, forming an equilateral spike; leaf-blades bearing at base a more or less well-marked pair of auriculate appendages. Tribe, *Hordeae*.
 - b. Spikelets sessile in 2 rows on one side of a flattened axis, forming 1-sided spikes which are digitate or paniculate, or sometimes solitary. Tribe, *Chlorideae*.

- (3). Spikelets with but one perfect flower, or monosporangiate; always in panicles or racemes, not in rows.
- a. Spikelets with 4 or more glumes.
- (a). Third glume enclosing a perfect flower just above the empty glumes; palet of the perfect flower usually 2-nerved. Tribe, *Agrostideæ*.
- (b). Fifth glume enclosing a perfect flower on the top of the spikelet; palet of the perfect flower usually 1-nerved or nerveless.

Tribe, *Phalarideæ*.

- b. Spikelets usually with but 2 glumes, or the lower empty glumes reduced; spikelets often monosporangiate.

Tribe, *Oryzeæ*.

II. Spikelets usually 2-flowered or by degeneration 1-flowered; rachilla articulated below the empty glumes which are thus deciduous with the flowers; spikelets more or less dorsally compressed; aerial stems annual.

Subfamily, **Panicatae**.

1. Flowering glumes, at least of the perfect flowers, similar in texture to the empty glumes, or frequently coriaceous or chartaceous (indurated), never thin and hyaline.
- a. Flowering glumes of the perfect flowers chartaceous or coriaceous, very different from the empty glumes.
- Tribe, *Paniceæ*.
- b. Flowering glumes membranous.
- (a). Inflorescence paniculate, spikelets deciduous singly from the ultimate branches; first empty glume usually smaller and narrower than the rest.
- Tribe, *Tristegineæ*.
- (b). Inflorescence spikate; spikelets deciduous singly or in groups; first empty glume usually larger than the rest, the second one often spiny.
- Tribe, *Zoysieæ*.
2. Flowering glumes thin and hyaline, much more delicate in structure than the thick-membranous or coriaceous empty glumes.
- a. Spikelets in pairs, one usually sessile the other pedicellate, the sessile spikelet with a perfect flower, the pedicellate one with a perfect, staminate, or sterile (vestigial) flower; lemmas of the perfect flowers usually awned. Tribe, *Andropogoneæ*.
- b. Spikelets monosporangiate, in separate inflorescences or in different parts of the same inflorescence, the carpellate portion or inflorescence below, the staminate above; lemmas awnless.

Tribe, *Maydeæ*.

SERIAL LISTS OF THE LOCAL GENERA OF GRASSES.

Festuceæ.

| | |
|--------------|-------------|
| Bromus. | Eatonia. |
| Uniola. | Koeleria. |
| Melica. | Korycarpus. |
| Festuca. | Tricuspis. |
| Panicularia. | Triplasis. |
| Poa. | Cynosurus. |
| Dactylis. | Phragmites. |
| Eragrostis. | |

Aveneæ.

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| Danthonia. | Deschampsia. |
| Arrhenatherum. | Aira. |
| Trisetum. | Holcus. |
| Avena. | |

Hordeæ.

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| Lolium. | Elymus. |
| Agropyron. | Hystrix. |
| Triticum. | Hordeum. |
| Secale. | |

Chlorideæ.

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| Spartina. | Eleusine. |
| Beckmannia. | Atheropogon. |
| Capriola. | Bouteloua. |

Agrostideæ.

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| Sporobolus. | Phleum. |
| Calamagrostis. | Muhlenbergia. |
| Agrostis. | Brachyelytrum. |
| Apera. | Milium. |
| Cinna. | Oryzopsis. |
| Ammophila. | Stipa. |
| Alopecurus. | Aristida. |
| Heleochloa. | |

Phalarideæ.

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| Savastana. | Anthoxanthum. |
| Phalaris. | |

Oryzeæ.

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| Homalocenchrus. | Zizania. |
| Zizaniopsis. | |

Paniceæ.

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| Panicum. | Paspalum. |
| Syntherisma. | Chaetochloa. |
| Echinochloa. | Cenchrus. |

Andropogoneæ.

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|--------------|-------------|
| Sorghum. | Manisuris. |
| Sorghastrum. | Andropogon. |

Maydeæ.

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| Tripsacum. | Zea. |
| Coix. | |