

TAXONOMY OF THE *DICHOTOMA* GROUP OF *DICHANTHELIUM* (POACEAE)

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ABSTRACT

Eleven taxa associated with the *Dichotoma* group of *Dichanthelium* are recognized, including eight species and three varieties. A summary of recent taxonomic treatment of the group is provided, along with a key to the species and varieties, plus synonymy, typification, discussion, distribution, and ecology. Six new combinations are made: *Dichanthelium annulum* (Ashe) R.J. LeBlond, *D. dichotomum* (L.) Gould var. *nitidum* (Lam.) R.J. LeBlond, *D. dichotomum* var. *ramulosum* (Torr.) R.J. LeBlond, *D. dichotomum* var. *roanokense* (Ashe) R.J. LeBlond, *D. lucidum* (Ashe) R.J. LeBlond, and *D. sphagnicola* (Nash) R.J. LeBlond.

RESUMEN

Se reconocen once taxa asociados con el grupo *Dichotoma* de *Dichanthelium*, que incluyen ocho especies y tres variedades. Se ofrece un resumen del reciente tratamiento taxonómico del grupo, junto con una clave para las especies y variedades, junto con sinonimias, tipificación, discusión, distribución y ecología. Se hacen seis combinaciones nuevas: *Dichanthelium annulum* (Ashe) R.J. LeBlond, *D. dichotomum* (L.) Gould var. *nitidum* (Lam.) R.J. LeBlond, *D. dichotomum* var. *ramulosum* (Torr.) R.J. LeBlond, *D. dichotomum* var. *roanokense* (Ashe) R.J. LeBlond, *D. lucidum* (Ashe) R.J. LeBlond, y *D. sphagnicola* (Nash) R.J. LeBlond.

INTRODUCTION

In their seminal treatment of North American *Panicum*, Hitchcock and Chase (1910) established *Dichanthelium* as a subgenus, which they further subdivided into 17 “minor groups. ... These names are not intended to be formal and should have no nomenclatural standing.” *Dichotoma* is one of these “minor groups,” though it should be noted that *Dichotoma* has been used to name a section that includes all North American species of *Dichanthelium* found north of Mexico (Hsu 1965; Crins 1991). *Dichanthelium* was elevated to generic rank by Gould (1974) based on morphological characters, an interpretation more recently supported by molecular data (Giussani et al. 2000).

Although most current treatments do not recognize the Hitchcock and Chase groups, the implied relationships are reflected in key groupings, infraspecific alignments, and synonymy. Hitchcock and Chase recognized 14 taxa in their *Dichotoma* group, all at the rank of species: *Panicum annulum* Ashe, *P. barbulatum* Michx., *P. boreale* Nash, *P. caerulescens* Hack. ex Hitchc., *P. clutei* Nash, *P. dichotomum* L., *P. lucidum* Ashe, *P. mattamuskeetense* Ashe, *P. microcarpon* Muhl.

ex Elliott, *P. multirameum* Scribn., *P. nitidum* Lam., *P. roanokense* Ashe, *P. sphagnicola* Nash, and *P. yadkinense* Ashe. *Panicum nudicaule* Vasey was added by synonymy in later treatments of *Dichotoma* taxa (Gould & Clark 1978; Clewell 1985; Hansen & Wunderlin 1988; Wunderlin 1998) but evidently is more closely related to tropical species or to members of Hitchcock and Chase's *Laxiflora* group. Gould and Clark (1978) treated *Dichanthelium boreale* (Nash) Freckmann (= *Panicum boreale*) as a species separate from their concept of the *Dichotoma* group, regarding it as appearing "to be close to and possibly intergrading with *D. dichotomum* var. *dichotomum* and *D. commutatum*." Gould and Clark also placed *Panicum bicknellii* Nash and *P. calliphyllum* Ashe, members of Hitchcock and Chase's *Bicknelliana* group, in synonymy with *D. boreale*.

This treatment recognizes 10 taxa—seven species and three varieties—from the original *Dichotoma* group: *Dichanthelium annulum* (Ashe) R.J. LeBlond (comb. nov.), *D. caerulescens* (Hack. ex Hitchc.) Correll, *D. dichotomum* (L.) Gould, *D. dichotomum* var. *nitidum* (Lam.) R.J. LeBlond (comb. nov.), *D. dichotomum* var. *ramulosum* (Torr.) R.J. LeBlond (comb. nov.) (= *Panicum microcarpon*), *D. dichotomum* var. *roanokense* (Ashe) R.J. LeBlond (comb. nov.), *D. lucidum* (Ashe) R.J. LeBlond (comb. nov.), *D. mattamuskeetense* (Ashe) Mohlenbr., *D. sphagnicola* (Nash) R.J. LeBlond (comb. nov.), and *D. yadkinense* (Ashe) Mohlenbr. Even though its closest relatives undoubtedly lie outside the *Dichotoma* group, *D. nudicaule* (Vasey) B.F. Hansen & Wunderlin is also treated here because of its morphological similarity to *Dichotoma* taxa (e.g., minute ciliate ligules, glabrous internodes), and because of recent treatments in synonymy. *Dichanthelium boreale* is in need of additional study and is not treated here. No attempt is made to elevate the status of *Dichotoma* above an informal grouping of taxa that appear to be very closely related (corroborated by synonymy assignments in recent treatments).

RECENT TAXONOMIC TREATMENT

Hitchcock and Chase's *Dichotoma* group species concepts were largely maintained in regional manuals until 1964. Fernald (1950) added *P. lucidum* var. *opacum* Fernald, treated *P. clutei* as *P. mattamuskeetense* var. *clutei* (Nash) Fernald, and treated *P. barbulatum* as *P. dichotomum* var. *barbulatum* (Michx.) A.W. Wood. Gleason (1952) added *P. annulum* var. *glabrescens* Gleason, treated *P. microcarpon* as *P. nitidum* var. *ramulosum* Torr., and synonymized *P. lucidum* var. *opacum* with *P. lucidum*, *P. clutei* with *P. mattamuskeetense*, *P. barbulatum* with *P. dichotomum*, and *P. caerulescens* with *P. roanokense*. In summary, Fernald recognized all 12 of the *Dichotoma* taxa attributed to the region covered by Gray's *Manual of Botany*, plus *P. lucidum* var. *opacum*, and Gleason recognized nine of the same taxa (not including *P. lucidum* var. *opacum*), plus *P. annulum* var. *glabrescens*. Among the Hitchcock and Chase *Dichotoma* taxa, only *Panicum multirameum* and *P. sphagnicola* were not known from the northeastern U.S.

Radford et al. (1964) reduced the 11 *Dichotoma* taxa known to occur in the Carolinas to a single taxon, *Panicum dichotomum* (not including *P. sphagnicola*, which was included in synonymy by Radford et al. 1968, but a specimen has not been found). This single-species concept was also used in several subsequent treatments, notably Correll and Johnson (1970), Gould and Clark (1978), Hansen and Wunderlin (1988), and Zuloaga et al. (1993). Gould and Clark additionally included all 11 species of Hitchcock and Chase's *Ensifolia* group within their concept of *D. dichotomum*, thereby reducing Hitchcock and Chase's concept of 25 species (not including *boreale* but including *nudicaule*) to a single species comprising five varietal taxa. The 13 *Dichotoma* taxa plus *nudicaule* were treated as a single taxon, *D. dichotomum* var. *dichotomum*, with the 11 *Ensifolia* species reduced to four varieties: *D. dichotomum* var. *ensifolium* (Baldwin) Gould & C.A. Clark, var. *tenuis* (Muhl.) Gould & C.A. Clark, var. *glabrifolium* (Nash) Gould & C.A. Clark, and var. *breve* (Hitchc. & Chase) Gould & C.A. Clark. *Ensifolia* taxa were separated from *Dichotoma* taxa at the species level in later treatments (Godfrey & Wooten 1979; Lelong 1984, 1986; Hansen & Wunderlin 1988; Gleason & Cronquist 1991; Zuloaga et al. 1993; Wunderlin 1998). Clewell (1985), however, exceeded even Gould and Clark's reduction by lumping all *Dichotoma* and *Ensifolia* taxa into a single taxon, *Dichanthelium dichotomum*.

Lelong (1984) argued that some taxa in Hitchcock and Chase's *Dichotoma* group deserved a better fate than "being buried in synonymy," and resurrected six former species as varieties of *Panicum dichotomum*: var. *lucidum* (Ashe) Lelong (including *P. sphagnicola* and *P. lucidum* var. *opacum*), var. *mattamuskeetense* (Ashe) Lelong (including *P. annulum* and *P. clutei*), var. *nitidum* (Lam.) A.W. Wood, var. *ramulosum* (Torr.) Lelong, var. *roanokense* (Ashe) Lelong (including *P. caeruleascens*), and var. *yadkinense* (Ashe) Lelong. Neither *Panicum boreale* nor its synonyms, *P. bicknellii* and *P. calliphyllum*, are included in synonymy under Lelong's concept of *Dichotoma* taxonomy. Lelong (1986) included *P. barbuiatum* in synonymy with *P. dichotomum* var. *dichotomum*, and recognized *Panicum nudicaule* at the rank of species. The only other Hitchcock and Chase *Dichotoma* entity is *Panicum multirameum*, known from Mexico to Venezuela and Jamaica. It is treated in the present study as a synonym of *D. dichotomum* var. *nitidum*.

DISTRIBUTION AND ECOLOGY

All 10 *Dichotoma* group taxa treated here, plus *Dichanthelium nudicaule*, are centered in the eastern U.S., and five are endemic: *Dichanthelium annulum*, *D. lucidum*, *D. mattamuskeetense*, *D. nudicaule*, and *D. sphagnicola*. Distribution of species and populations in the U.S. is concentrated in the Atlantic and Gulf Coast states from New Jersey south to Florida and west to Texas, and extending as far inland as Illinois, Missouri, and Oklahoma. *Dichanthelium dichotomum* var. *dichotomum* is the only taxon reaching Canada (New Brunswick and

Ontario). Three taxa range southward to the Bahamas and West Indies: *D. caerulescens*, *D. dichotomum* var. *nitidum*, and *D. dichotomum* var. *roanokense* (the last not in the Bahamas). Two reach Mexico: *D. dichotomum* var. *nitidum* and *D. yadkinense*, with *D. dichotomum* var. *nitidum* reaching Central America and South America (Venezuela).

Within the U.S., three are endemic to the Atlantic and/or Gulf coastal plains: *D. mattamuskeetense*, *D. nudicaule*, and *D. sphagnicola*. *Dichanthelium caerulescens* and *D. dichotomum* var. *roanokense* are restricted to the coastal plain in the U.S. portion of their ranges. *Dichanthelium dichotomum* var. *nitidum* and *D. lucidum* are primarily found on the coastal plain in the U.S., but range inland: *nitidum* to the Appalachians, and *lucidum* to the Great Lakes. *Dichanthelium dichotomum* var. *dichotomum*, *D. dichotomum* var. *ramulosum*, and *D. yadkinense* are widespread from the Atlantic and Gulf coasts to the Midwest, though *D. yadkinense* appears to be less frequent. Only *Dichanthelium annulum* is primarily an inland species, nearly restricted to the Appalachian Province with very few coastal plain occurrences.

Literature sources for range data in the descriptions are Hitchcock and Chase (1910, 1915), Fernald (1950), Hitchcock (1951), Correll and Correll (1982), Lelong (1986), Zuloaga et al. (1993), Homoya et al. (1995), Angelo and Boufford (1998), and Schuyler (2000). All reported U.S. states of occurrence are listed, including District of Columbia (DC).

The majority of *Dichotoma* group taxa are adapted to wet habitats, including swamps, marshes, and wet pine savannas and flatwoods. *Dichanthelium dichotomum* var. *ramulosum* and *D. dichotomum* var. *nitidum*, primarily plants of wet habitats, can occasionally be found in dry situations (with var. *nitidum* known only from dry habitats south of the U.S.). *Dichanthelium dichotomum* var. *dichotomum* is primarily a plant of wet-mesic to dry woodlands. *Dichanthelium annulum* is a plant of dry rocky or sandy open woods and calcareous grasslands (barrens) and is thus distinguished by habitat and range as well as by morphology from other *Dichotoma* taxa. All of the *Dichotoma* taxa (plus *D. nudicaule*) primarily or exclusively found on the Atlantic and/or Gulf coastal plains are restricted to wetland habitats.

SYSTEMATICS

Dichanthelium is a frustratingly complex genus. Familiarity with living populations is helpful in understanding taxonomic concepts, but lack of *in situ* familiarity with taxa outside of one's area of work can lead to parochial treatments. Many *Dichanthelium* taxa are clinal, distinct in one part of their range and indistinct in another, adding to the difficulty of a range-wide approach. Intermediates can be found even among apparently more stable taxa. Despite these difficulties, most *Dichotoma* specimens, and especially living plants, are readily assignable to a taxon and most taxa display fidelity to a limited range of habitats.

The following key and discussions are proposed as a foundation for a range-wide treatment of *Dichotoma* group taxa. They result from field and herbarium study beginning in 1985, and the accumulated efforts of other students of the genus. Field familiarity includes much of the Atlantic and Gulf coastal plains from Massachusetts to Mississippi, and Andros Island in the Bahamas. Since 1990 I have been a fulltime field botanist in the coastal plain of North Carolina, where nine of the 10 *Dichotoma* taxa are found. The treatment is based primarily on a study of the extensive collections at US, NCU and DUKE, specimens in my own collection, and living populations. As much as possible, it relies on features of the spikelet to distinguish taxa, particularly spikelet and first glume length, pubescence, and fertile lemma length and width. Taxa with consistent diagnostic characters throughout their range are treated as full species, even if sometimes appearing intermediate toward other taxa in some features (e.g., *D. mattamuskeetense*, *D. sphagnicola*).

KEY TO *DICHANTHELIUM DICHOTOMA* GROUP TAXA AND *D. NUDICAULE*

1. Nodes, at least lower, bearded.
 2. Culm internodes (at least middle and upper) and peduncle sparsely to moderately spreading short-hairy, sometimes also glandular; vernal cauline blades velvety-pubescent on both surfaces, often densely so; spikelets (1.5–)1.8–2.1 mm long; plants of dry rocky or sandy soil and barrens _____ **1. *D. annulum***
 2. Culm internodes glabrous; at least middle and upper cauline blades glabrous (if pubescent, then spikelets 2.0–2.8 mm long in *D. mattamuskeetense*, or fertile lemma densely papillose in *D. lucidum*); spikelets 1.4–2.8 mm long; plants mostly of wet soils and mesic to dry woodlands.
 3. Spikelets glabrous.
 4. Spikelets 1.8–2.3 mm long; first glume 0.6–1.1 mm long; fertile lemma 0.8–1.0 mm wide; widest vernal blades 3–8(–10) mm wide _____ **3. *D. dichotomum***
var. ***dichotomum***
 4. Spikelets 1.4–1.9 mm long; first glume 0.3–0.6(–0.7) mm long; fertile lemma 0.6–0.8 mm wide; widest vernal blades 7–15 mm wide _____ **5. *D. dichotomum***
var. ***ramulosum***
 3. Spikelets pubescent (rarely in *D. dichotomum* var. *ramulosum*).
 5. Spikelets (2.0–)2.2–2.8 mm long; first glume 0.5–1.3 mm long; fertile lemma 1.8–2.3 mm long; lowest vernal cauline blades pubescent at least abaxially _____ **8. *D. mattamuskeetense***
 5. Spikelets 1.4–2.2 mm long; first glume 0.3–0.9 mm long; fertile lemma 1.4–1.7 mm long; lowest vernal cauline blades glabrous.
 6. Spikelets 1.7–2.2 mm long; first glume 0.6–0.9 mm long; fertile lemma 0.7–1.0 mm wide _____ **4. *D. dichotomum*** var. ***nitidum***
 6. Spikelets 1.4–1.9 mm long; first glume 0.3–0.6(–0.8) mm long; fertile lemma 0.6–0.8 mm wide _____ **5. *D. dichotomum*** var. ***ramulosum***
1. Nodes beardless, though sometimes short-pubescent.
 7. Culine leaves mostly basally disposed, strongly ascending, much larger than the 2–3 remote middle and upper cauline leaves of fertile culms; spikelets 2.4–2.9 mm long; culms branch from basal and lower nodes, but are not known to produce autumnal inflorescences _____ **9. *D. nudicaule***

7. Cauline leaves well-distributed along culm, more than three, gradually reduced upwards and often spreading; spikelets 1.4–2.6 mm long; culms branch either from all nodes, or from middle and/or upper nodes, producing autumnal inflorescences.
8. Widest vernal cauline blades 7–15 mm wide; upper sheaths often glutinous-warty; spikelets 2.1–2.6 mm long, some or most acute to beaked, second glume and sterile lemma extending 0.3–0.5 mm beyond fertile lemma in at least some spikelets _____ **11. *D. yadkinense***
8. Widest vernal cauline blades 3–10 mm wide; upper sheaths not glutinous-warty; spikelets 1.4–2.7 mm long, blunt to subacute, second glume and sterile lemma equal to or shorter than fertile lemma, or extending less than 0.3 mm beyond it.
9. Spikelets 1.4–1.8 mm long; first glume 0.3–0.8 mm long; fertile lemma 1.3–1.5 mm long, smooth; mature vernal panicles usually short-exserted with ascending branches; fresh foliage bluish-glaucous _____ **2. *D. caerulescens***
9. Spikelets (1.5–)1.7–2.7 mm long, if as short as 1.5 mm, then with densely papillose fertile lemma (*D. lucidum*); first glume 0.6–1.4 mm long; fertile lemma 1.5–2.2 mm long, smooth or densely papillose; mature vernal panicles exerted with spreading branches; fresh foliage not bluish-glaucous.
10. Culms weak, soon sprawling over other vegetation; spikelets either pubescent or fertile lemma and palea minutely but densely papillose at 20×.
11. Spikelets 2.2–2.7 mm long, pubescent; first glume 1.0–1.4 mm long; fertile lemma and palea smooth or with a few weak papillae at 20× _____ **10. *D. sphagnicola***
11. Spikelets (1.5–)1.7–2.3 mm long, glabrous (rarely pubescent); first glume 0.7–1.1 mm long; fertile lemma and palea densely papillose at 20× _____ **7. *D. lucidum***
10. Culms stiffer, erect to ascending; spikelets glabrous, fertile lemma with no or few papillae.
12. Vernal cauline blades stiffly erect; plants of wet pine savannas and open swamps _____ ***D. dichotomum* var. *roanokense***
12. Vernal cauline blades spreading to deflexed, flexuous; plants of wet-mesic to dry woods and thickets _____ **3. *D. dichotomum* var. *dichotomum***

1. *Dichanthelium annulum* (Ashe) R.J. LeBlond, comb. nov. *Panicum annulum* Ashe, J. Elisha Mitchell Sci. Soc. 15:58. 1898. *Panicum bogueanum* Ashe, J. Elisha Mitchell Sci. Soc. 16:85. 1900, nom. illegit. TYPE: U.S.A. DISTRICT OF COLUMBIA: Dry rocky woods, Woodley Park, 1882, Ward s.n. (LECTOTYPE: US!; SYNTYPE: US!).

Panicum annulum var. *glabrescens* Gleason is referable to *D. mattamuskeetense* (Ashe) Mohlenbr.

This poorly known species has been infrequently collected and is presumably rare over its range. It has been treated in synonymy with *D. dichotomum* var. *dichotomum*, specifically with what is here treated as *D. mattamuskeetense*, because of plants from southeastern Massachusetts. *Dichanthelium annulum* is a plant of dry rocky or sandy soil of open woods and calcareous grasslands (barrens), while *D. mattamuskeetense* inhabits wet sandy or peaty acidic soils of wet pine savannas and meadows, and wet borders of pocosins and thickets. As indicated in the key, the middle and upper internodes and peduncle of *D.*

annulum are sparsely to moderately spreading pubescent with hairs 0.1–0.3 mm long. All internodes of *D. mattamuskeetense* are glabrous. Additionally, the internodes of *D. annulum* are typically dull, while those of *D. mattamuskeetense* are shiny. Spikelets of *D. annulum* are (1.5–)1.8–2.1 mm long with first glumes 0.6–0.9 mm long. In *D. mattamuskeetense*, spikelets are 2.0–2.8 mm long with first glumes 0.5–1.3 mm long. Fertile lemmas are (1.2–)1.4–1.8 mm long and 0.8–1.0 mm wide in *D. annulum* and 1.8–2.3 mm long and (0.8–)1.0–1.3 mm wide in *D. mattamuskeetense*. Plants from southeastern Massachusetts with all blades pubescent on both surfaces, glabrous internodes, spikelets 2.2–2.5 mm long, and occurring on moist ground, were treated by Gleason (1952) as *P. annulum* var. *glabrescens* Gleason. These plants may be the source of Fernald's (1950) declaration that *P. annulum* is "perhaps better merged with [*mattamuskeetense*]." Glabrous internodes, spikelet length, and habitat are a much better fit for *D. mattamuskeetense*, as is range. Based on these conditions and character states, *P. annulum* var. *glabrescens* is here synonymized with *D. mattamuskeetense*.

Dichanthelium annulum is one of the more distinctive entities within the *Dichotoma* group. Its combination of short-hairy upper internodes and velvety-pubescent leaves (upper as well as lower) distinguish it from all other taxa in the Hitchcock and Chase *Dichotoma* group. I have not found a treatment that specifically describes the internode pubescence character, but Ashe (1898) described the culms as "below pilose, above generally glabrous," which is opposite of the condition expressed in the two types at US, which are cited in Ashe's paper. Culm internodes and the panicle axis are often glandular in *D. annulum*, with resinous nodules frequently in the grooves between upper internode longitudinal ridges, and with pellucid spots often present on the peduncle and panicle axis (both types at US express these characters). While glutinous-warty spots are encountered on sheaths in the *Dichotoma* group (notably *D. yadkinense* and *D. dichotomum* var. *nitidum*), and occasionally pellucid spots in the panicle axis and branches of *D. dichotomum* var. *nitidum*, further study may show that these glandular expressions provide additional distinguishing characters.

Distribution and habitat.—Distribution of *Dichanthelium annulum* is primarily in the Appalachian Province with very few occurrences on the coastal plain, from New Jersey to Georgia, west to Mississippi, and in Tennessee, south-east Missouri, and southern Indiana (AL, DC, DE, GA, IN, MD, MO, MS, NC, NJ, PA, TN, VA). Recent collections have been made in Lee Co., VA, on July 22, 1996 (J.C. Ludwig 2872 & G. Fleming, pers. herb. R.J. LeBlond), and in Harrison Co., IN, on May 19, 1991 (Homoya et al. 1995). A specimen at US (*Hanes & Hanes s.n.*, 3 Jul 1934) that may be the source of Michigan's inclusion in the Hitchcock (1951) range has sparsely bearded nodes, glabrous internodes, and leaves that are membranous, subcordate, and pubescent. This entity may be more closely related to *D. commutatum* (J.A. Schultes) Gould. A specimen at US (*Neill 5021*) that may

be the source of Florida's inclusion in the Hitchcock (1951) range has pubescent leaves and pubescent spikelets 1.8–2.0 mm long, but a glabrous and shiny culm. It is not typical and may be more closely related to *D. dichotomum* var. *nitidum*. No other specimens of *D. annulum* have been seen from Michigan or Florida and these states are not here included in the distribution. *Dichanthelium annulum* is a plant of dry rocky or sandy soil of open woods and calcareous grasslands (barrens).

2. *Dichanthelium caerulescens* (Hack. ex Hitchc.) Correll, *J. Arnold Arbor.* 60:154. 1979. *Panicum caerulescens* Hack. ex Hitchc., *U.S. Natl. Herb. Contr.* 12:219. 1909. TYPE: U.S.A. FLORIDA. DADE CO.: "In glade among *Spartina*, etc.," 3 Apr 1906, *Hitchcock* 706 (HOLOTYPE: US!).

This species has the smallest spikelets and fertile lemmas among the *Dichotoma* taxa with beardless nodes and non-papillose fertile lemmas. Combined with the usually narrow and short-exserted vernal panicles, bluish-glaucous fresh foliage, and usually erect vernal blades, these characters readily distinguish *Dichanthelium caerulescens* from other *Dichotoma* taxa. It is most similar in habit to *D. dichotomum* var. *roanokense*, which has spikelets 1.8–2.2 mm long (1.4–1.8 mm in *D. caerulescens*) and fertile lemmas 1.6–1.8 mm long (1.3–1.5 mm in *D. caerulescens*). The culms of *D. dichotomum* var. *roanokense* on average are 5–10 dm tall while those for *D. caerulescens* are 3–7.5 dm tall and not as stout. *Dichanthelium caerulescens* also prefers less acidic soils than *D. dichotomum* var. *roanokense*.

Distribution and habitat.—The documented range of *Dichanthelium caerulescens* is discontinuous and restricted to near the coastal edge in New Jersey, Virginia, and North Carolina, and from both coasts of Florida through southern Alabama and Mississippi to Louisiana. It also occurs in the Bahamas, western Cuba, and Puerto Rico. *Dichanthelium caerulescens* inhabits marshes, swamps, wet pinelands, maritime grasslands, and damp sandy soil near the coast. It is most frequently found in habitats where an alkaline or calcareous influence is evident and appears to be one of the least collected members of the *Dichotoma* group.

3. *Dichanthelium dichotomum* (L.) Gould var. ***dichotomum***, *Brittonia* 26:59. 1974. *Panicum dichotomum* L., *Sp. Pl.* 58. 1753. *Chasea dichotoma* (L.) Nieuwl., *Amer. Midl. Naturalist* 2:64. 1911. TYPE: U.S.A. VIRGINIA: "Habitat in Virginia," *Clayton* 458 (LECTOTYPE: BM; ISOLECTOTYPE: US!, fragment).

Panicum barbulatum Michx. 1803, *Fl. Bor. Amer.* 1:49. 1803. *Panicum dichotomum* var. *barbulatum* (Michx.) A.W. Wood, *Class-Book Bot.*, ed. 3:786. *Panicum pubescens* Lam. var. *barbulatum* (Michx.) Britton, *Cat. Pl. New Jersey* 280. 1889. *Panicum nitidum* var. *barbulatum* (Michx.) Chapm., *Fl. South. U.S.*, ed. 3:586. 1897. TYPE: CANADA: "Hab. in Canada *P. capillari* affine. Ad ripas amnis: Rivierre a Jacques Cartier dicti legi," *Michaux s.n.* (LECTOTYPE: P-MICH; ISOLECTOTYPE: US!, fragment).

Panicum angustifolium Leconte ex Torr., *Cat. Pl. New York* 91. 1818, non Elliott 1816. TYPE:

unknown. "A vernal specimen in the Torrey Herbarium penciled 'angustifolius (nitid. var.)' but without data may be the type" (Hitchcock & Chase 1910).

Panicum tremulum Spreng., Neue Entd. 2:103. 1821. TYPE: U.S.A.: without data, *Muhlenberg Herb. s.n.* (LECTOTYPE: B, destroyed; ISOLECTOTYPE: US, fragment).

Panicum dichotomum L. var. *divaricatum* Vasey, U.S.D.A. Div. Agrost. Bull. 8:30. 1889. TYPE: U.S.A. MISSISSIPPI: SCOTT CO.: Lake, *Tracy 127* (LECTOTYPE: US!).

Panicum dichotomum L. var. *viride* Vasey, U.S.D.A. Div. Agrost. Bull. 8:30. 1889. *Panicum nitidum* Lam. var. *viride* (Vasey) Britton, Trans. New York Acad. Sci. 9:14. 1889. *Panicum ramulosum* Michx. var. *viride* (Vasey) Porter, Bull. Torrey Bot. Club 20:194. 1893. TYPE: U.S.A. DISTRICT OF COLUMBIA: Woodley Park, 1881, *Ward s.n.* (LECTOTYPE: US!).

Panicum nitidum Lam. var. *pauciflorum* Britton, Trans. New York Acad. Sci. 9:14. 1889. TYPE: U.S.A.: NEW JERSEY: MORRIS CO.: Shady moist grounds, July [without year], *Britton s.n.* (HOLOTYPE: NY).

Panicum dichotomum L. var. *commune* S. Watson & J.M. Coulter in A. Gray, Manual, ed. 6. 633. 1890. TYPE: unknown.

Panicum gravior Hitchc. & Chase, Rhodora 8:205. 1906. TYPE: U.S.A. DELAWARE: NEWCASTLE CO.: "in sandy, rather dry woods, on the old Commons farm, between Centerville and Mt. Cuba," 30 Jul 1906, *Chase 3620* (HOLOTYPE: US!). Placed in synonymy with *Panicum barbuiatum* Michx. by Hitchcock and Chase (1910).

Recognition of the several species and varieties in this treatment reduces but by no means eliminates the apparent genetic diversity in *Dichanthelium dichotomum* var. *dichotomum*. Robust plants with bearded nodes, leaves to 10 mm wide, and top-heavy autumnal inflorescences are referable to *Panicum barbuiatum* (*P. dichotomum* var. *barbuiatum*), but intermediates abound. Plants frequently are found with bearded nodes, but with the smaller leaves and culms typical of the glabrous node form.

Distribution and habitat.—*Dichanthelium dichotomum* var. *dichotomum* ranges from southern Canada (N.B., Ont.) south to the Gulf Coast, occurring throughout the eastern U.S. (AL, AR, CT, DC, DE, FL, GA, IL, IN, KY, LA, MA, MD, ME, MI, MO, MS, NC, NH, NJ, NY, OH, OK, PA, RI, SC, TN, TX, VA, VT, WV). Gould (1980) included this in synonymy in his treatment of *D. dichotomum* var. *dichotomum* sensu lato in Mexico, but var. *dichotomum* sensu stricto needs confirmation. *Dichanthelium dichotomum* var. *dichotomum* is the most widespread and frequent taxon within the *Dichotoma* group in the U.S., occurring in all states from which other members of the group have been documented. It is found primarily in wet-mesic to dry woods, thickets, and woodland openings.

4. *Dichanthelium dichotomum* (L.) Gould var. **nitidum** (Lam.) R.J. LeBlond, comb.

NOV. *Panicum nitidum* Lam., Tabl. Encycl. 1:172. 1791. *Panicum dichotomum* L. var. *nitidum* (Lam.) A.W. Wood, Class-Book Bot., ed. 3:786. *Dichanthelium nitidum* (Lam.) Mohlenbr., *Erigenia* 6:26. 1985. TYPE: U.S.A. "E. CAROLINA:" *Fraser s.n.* (HOLOTYPE: P-LAM; ISOTYPE: US!, fragment and photo).

Panicum nodiflorum Lam., Encycl. 4:744. 1798. *Panicum dichotomum* var. *nodiflorum* (Lam.) Griseb., Cat. Pl. Cuba 234. 1866. TYPE: U.S.A. "CAROLINE:" *Fraser s.n.* (HOLOTYPE: P-LAM; ISOTYPE: US, fragment and photo).

Panicum multirameum Scribn., U.S.D.A. Div. Agrost. Circ. 19:2. 1900. TYPE: MEXICO: VERACRUZ: near Jalapa, 1889, *Pringle 7882* (LECTOTYPE: US!; ISOLECTOTYPE: MO).

Panicum subbarbulatum Scribn. & Merr., U.S.D.A. Div. Agrost. Circ. 29:9. 1901. TYPE: U.S.A.: Elliott Herb. s.n. (HOLOTYPE: CHARL!; ISOTYPE: US!, fragment).

Panicum multirameum, recognized by Hitchcock and Chase (1910, 1915), is an entity from Mexico, Guatemala, and Jamaica. Hitchcock and Chase (1910) describe it as “allied to *P. nitidum*,” and a handwritten note (by J.R. Swallen, per P. Peterson, pers. comm.) on the outside of the Mexico-CA *Panicum nitidum* folder at US reads: “There are no consistent characters to distinguish *P. multirameum* from *P. nitidum*. Neither the habit of the autumnal phase nor the viscid-spotted sheaths are constant characters. The type of *P. multirameum* is from dry hills, which would account for its aspect. 5/15/50.” I concur with this conclusion after review of the *P. multirameum* specimens at US, although an apparent difference in habitat may warrant further study.

Distribution and habitat.—In the U.S., *Dichanthelium dichotomum* var. *nitidum* is found in the coastal plain from Pennsylvania and New Jersey south to Florida and west to east Texas; also in southeastern Missouri (DE, FL, GA, LA, MO, MS, NC, NJ, PA, SC, TX, VA). There are a few scattered mountain and piedmont records from Virginia to Georgia. It is also known from the Bahamas and West Indies, and from Mexico to Venezuela. *Dichanthelium dichotomum* var. *nitidum* occurs on moist sandy or peaty soil of wet pine savannas and pocosin ecotones, in wet meadows near the coast, and reportedly from swamps and marshes. The *Panicum multirameum* specimens are from dry hills and gravelly banks.

5. *Dichanthelium dichotomum* (L.) Gould var. *ramulosum* (Torr.) R.J. LeBlond, comb. nov. *Panicum nitidum* Lam. var. *ramulosum* Torr., Fl. N. Middle United States 146. 1824. *Panicum dichotomum* L. var. *ramulosum* (Torr.) Lelong, Brittonia 36:265. 1984. TYPE: U.S.A. NEW JERSEY: near Quaker Bridge, Jun 1818, *Torrey* s.n. (HOLOTYPE: NY).

Panicum microcarpon Muhl. ex Elliott, Sketch Bot. S. Carolina 1:127. 1816. *Dichanthelium microcarpon* (Muhl. ex Elliott) Mohlenbr., Erigenia 6:26. 1985. TYPE: U.S.A. GEORGIA: Baldwin s.n. (LECTOTYPE: CHARL!). Two fragments at US! labeled as isolectotypes of *P. microcarpon* are assignable to *P. polyanthes* Schult. and are examples of the nomenclatural problem discussed by Hitchcock and Chase (1910) for this name.

The infrequent occurrences of pubescent spikelets or first glumes to 0.8 mm in length in *Dichanthelium dichotomum* var. *ramulosum* suggest intergradation with another taxon, possibly *D. dichotomum* var. *nitidum*. The width of the fertile lemma appears to be a more reliable character than the width of the spikelet as a whole (the latter used by Fernald 1950), especially in herbarium specimens.

Distribution and habitat.—*Dichanthelium dichotomum* var. *ramulosum* is found from Massachusetts west to Michigan and south to Florida and Texas (AL, AR, CT, DC, DE, FL, GA, IL, IN, KY, LA, MA, MD, MI, MO, MS, NC, NJ, NY, OH, OK, PA, RI, SC, TN, TX, VA, WV). Gould (1980) included this in synonymy (as *Panicum microcarpon*) in his treatment of *D. dichotomum* var. *dichotomum*

in Mexico, but its occurrence there needs confirmation. *Dichanthelium dichotomum* var. *ramulosum* inhabits floodplain forests, swamps, openings, and borders of streams and ponds, and is occasionally found in dry upland woods.

6. *Dichanthelium dichotomum* (L.) Gould var. *roanokense* (Ashe) R.J. LeBlond, comb. nov. *Panicum roanokense* Ashe, J. Elisha Mitchell Sci. Soc. 15:44. 1898. *Panicum dichotomum* L. var. *roanokense* (Ashe) Lelong, Brittonia 36:265. TYPE: U.S.A. NORTH CAROLINA: DARE CO.: Roanoke Island, Jun 1898, Ashe s.n. (PARATYPE: US!, NCU!). The specimen at NCU is labeled "*Panicum roanokense* Type" in Ashe's handwriting and was collected by him, but lacks a date and locale.

Panicum curtivaginum Ashe, J. Elisha Mitchell Sci. Soc. 16:85. 1900. TYPE: U.S.A. MISSISSIPPI: JACKSON CO.: Petit Bois Island, 8 May 1898, Tracy 4584 (ISOLECTOTYPE: US!). The lectotype, suspected to be at NCU (Hansen & Wunderlin 1988), could not be located.

Dichanthelium dichotomum var. *roanokense* is quite distinctive in the field with its stiff and erect vernal blades, but I can find no other character to consistently separate it from *D. dichotomum* var. *dichotomum*. Other treatments (Hitchcock & Chase 1910; Small 1933; Hitchcock 1951; Fernald 1950; Gleason 1952) variously have used node annulus length, grayish olive-green blade color, spikelet turgidity, glume nerves, and glume basal coloring to separate var. *roanokense* from other *D. dichotomum* taxa, especially var. *dichotomum*. Fernald described the node annulus (the disk-like cartilaginous structure separating the internodes) as two-thirds or more as long as wide in var. *roanokense*, compared with "rarely" one-third as long as wide in var. *dichotomum*. Plants otherwise matching var. *roanokense* but with an annulus less than one-third as long as wide are common. Plants matching var. *roanokense* with olive-green blades are frequent, but plants with green and purplish-tinged blades are also encountered. Spikelets tend to be more turgid than in var. *dichotomum*, and glume and sterile lemma nerves tend to be more pronounced, but there is too much variability in both taxa for this to be of use. Purplish-based glumes are frequent, but also occur in var. *dichotomum*. *Dichanthelium dichotomum* var. *roanokense* is perhaps transitional between var. *D. dichotomum* var. *dichotomum* and *D. caerulescens*.

Distribution and habitat.—The primary range for *Dichanthelium dichotomum* var. *roanokense* in the U.S. is near the coast from Delaware and Virginia south to Florida and west to Texas (AL, DE, FL, GA, LA, MS, NC, SC, TX, VA). It also occurs in Jamaica. Gould (1980) included this in synonymy in his treatment of *D. dichotomum* var. *dichotomum* in Mexico, but its occurrence there needs confirmation. This taxon is found in wet pine savannas, swamp openings, and wet peaty meadows.

7. *Dichanthelium lucidum* (Ashe) R.J. LeBlond, comb. nov. *Panicum lucidum* Ashe, J. Elisha Mitchell Sci. Soc. 15:47. 1898. *Panicum dichotomum* L. var. *lucidum* (Ashe) Lelong, Brittonia 36:265. 1984. TYPE: U.S.A. NORTH CAROLINA: DARE CO.: swamps bordering Lake Mattamuskeet, Jun 1898, Ashe s.n. (LECTOTYPE: US!).

Panicum lucidum Ashe var. *opacum* Fernald, *Rhodora* 39:386. 1937. TYPE: U.S.A. VIRGINIA: PRINCE GEORGE CO.: boggy depression north of Gary Church, 25 Aug 1936, *Fernald and Long* 6484 (HOLOTYPE: GH; ISOTYPES: MO, NY, PH, US!).

Panicum taxodiorum Ashe is referable to *Dichanthelium longiligulatum* (Nash) Freckmann (LECTOTYPE: NCU!).

The densely papillose fertile lemma and palea readily separate *Dichanthelium lucidum* from all other *Dichotoma* taxa. Fertile lemmas in other taxa in the group can have a few scattered papillae or longitudinally elongate reticulations, but are otherwise smooth. The papillae in *D. lucidum* cover the entire surface and are most easily seen at 20× or greater, with the pebbled texture discernable at 10×. Fernald (1950) described the fertile lemma as “obviously cellular-reticulate,” but the papillate structure is evident when the edge of the fertile lemma is viewed at 20×. *Dichanthelium lucidum* is recognized in the field by its habit of sprawling over other vegetation (also see discussion under *D. sphagnicola*). Fernald (1937) described *Panicum lucidum* var. *opacum* from “an extensive boggy depression” in southeastern Virginia, distinguishing it from the typical variety by opaque strigose-pilose leaves (vs. lustrous and glabrous), and spikelets 1.5–1.8 mm long (vs. 1.9–2.1 mm). The isotype at US has leaves pilose to glabrous, but the vestiture cannot be described as strigose. However, this character state may be present *in situ*, and may be lost over time in herbarium specimens. The lustrous (satiny) leaf surface character is often absent (at least when dried) among specimens with glabrous leaves and larger spikelets. Gleason (1952) stated that “(i)ntermediates exist with glabrous leaves and small spikelets, or with puberulent leaves and typical spikelets.” Glabrous plants with spikelets as short as 1.7–1.8 mm are frequent from the Carolinas to the Gulf Coast.

Distribution and habitat.—*Dichanthelium lucidum* is found primarily along the coast from Massachusetts south to Florida and west to Texas and Arkansas; it also occurs near the Great Lakes in Michigan and Indiana (AL, AR, CT, DC, DE, FL, GA, IN, LA, MA, MD, MI, MS, NC, NJ, NY, PA, SC, TN, TX, VA). This species inhabits wet meadows, sphagnous swamps, bogs, wet woods, and sphagnous streamheads (known as streamhead pocosins in the Carolina Sandhills and baygalls in the Gulf Coast).

8. *Dichanthelium mattamuskeetense* (Ashe) Mohlenbr., *Erigenia* 6:26. 1985. *Panicum mattamuskeetense* Ashe, *Journ. Elisha Mitchell Sci. Soc.* 15:45. 1898. *Panicum dichotomum* L. var. *mattamuskeetense* (Ashe) Lelong, *Brittonia* 36:265. TYPE: U.S.A. NORTH CAROLINA: HYDE. CO.: Lake Mattamuskeet, 10 Jun–6 Jul 1898, *Ashe s.n.* (LECTOTYPE: US!; ISOLECTOTYPE: NY).

Panicum clutei Nash, *Bull. Torrey Bot. Club* 26:569. 1899. *Panicum mattamuskeetense* Ashe var. *clutei* (Nash) Fernald, *Rhodora* 39:386. 1937. *Panicum dichotomum* var. *clutei* (Nash) C.F. Reed, *Phytologia* 67:452. TYPE: U.S.A. NEW JERSEY: BURLINGTON CO.: Tuckerton to Atsion, 3–6 Jul 1899, *Clute s.n.* (HOLOTYPE: NY!).

Panicum flexuosum Muhl. ex Scribn. & Merr., *U.S. Dept. Agric. Div. Agrost. Circ.* 27:3. 1900, nom. illegit., non Retz. 1791. (ISOTYPE: US!, fragment).

Panicum annulum Ashe var. *glabrescens* Gleason, *Phytologia* 4:21–22. 1952. TYPE: U.S.A. MASSACHUSETTS: BARNSTABLE CO.: Along roads leading from cranberry bogs east of Slough Road, Harwich, 18 Aug 1918, *Fernald & Long 16044* (HOLOTYPE: NY!). At US! is a specimen labeled as an isotype of *P. annulum* var. *glabrescens* from Barnstable Co., Massachusetts, “Along cart road from cranberry bogs east of Slough Road, Harwich,” 9 Jul 1918, *Fernald 16043*, but there is no indication in the protologue or on the specimen sheet itself that Gleason designated this as a type.

One of the most distinctive of the *Dichotoma* taxa, *D. mattamuskeetense* is larger not only in spikelet and fertile lemma length, but tends to have the tallest and thickest culms, and the herbage tends to be a darker and more frequent purple-maroon. Plants with only the lowest nodes, sheaths, and blades pubescent, and with smaller spikelets, have been treated as *Panicum clutei* (Hitchcock & Chase 1910; Hitchcock 1951) or *P. mattamuskeetense* var. *clutei* (Fernald 1950). Hitchcock and Chase (1910) describe *P. clutei* as “but doubtfully distinguished from *P. mattamuskeetense*,” and there is considerable variability relative to plant pubescence and spikelet size throughout the range. Plants with glabrous middle and upper portions and with larger spikelets (2.4–2.8 mm long) are frequent in the southern portion of the range, and more pubescent plants with smaller spikelets (2.2–2.5 mm long) are known from southern New England. Also see discussion under *Dichanthelium annulum*.

Distribution and habitat.—*Dichanthelium mattamuskeetense* is found in the Atlantic coastal plain from southeastern Massachusetts south to northeastern South Carolina (DC, DE, MA, MD, NC, NJ, NY, RI, SC, VA). In the northern part of its range (Massachusetts to New Jersey), it is frequently found in the margins of cranberry bogs and in margins and openings of red maple–Atlantic white cedar swamps. Farther south it is found in damp to wet sandy or peaty soil of wet pine savannas and meadows, and wet borders of pocosin shrub swamps and thickets.

9. *Dichanthelium nudicaule* (Vasey) B.F. Hansen & Wunderlin, *Novon* 11:367. 2001. *Panicum nudicaule* Vasey, U.S.D.A. Div. Bot. Bull. 8:31. 1889. TYPE: U.S.A. FLORIDA: swamps, Santa Rosa Co.: May 1886, *Curtiss 3583* (LECTOTYPE: US!; ISOLECTOTYPES: NY, TAES, US!).

Panicum nudicaule was “tentatively” placed in a single-taxon group, *Nudicaulia*, by Hitchcock and Chase (1910) based on “the narrow, enveloping base of the blades, and the nearly naked culms.” They allowed that the “technical characters” suggest placement in the *Dichotoma* group, and *D. nudicaule* has been synonymized with *D. dichotomum* by recent authors (Gould & Clark 1978; Clewell 1985; Hansen & Wunderlin 1988; Wunderlin 1998). The blades gradually narrow proximally and frequently the base is no wider than the summit of the sheath, although envelopment of the culm by the basal portion of the blade is not a consistent character. Blade bases are frequently conduplicate (a continuation of the sheath folding), but are as likely to be free of the culm as

to enclose it. (In their 1910 description of *P. nudicaule*, Hitchcock and Chase modified this *Nudicaulia* group character by describing the blade as “somewhat enveloping the culm at base.”) The elongate lower culm blades are numerous and crowded and the middle and upper blades of fertile culms are few, distant, and markedly smaller. This leaf arrangement is due to short lower culm internodes and elongate upper culm internodes. Lower sheaths tend to be much shorter than the blades while middle and upper sheaths are often much longer than the blades.

Other important morphological characteristics of *Dichanthelium nudicaule* suggest its closest relatives lie outside the *Dichotoma* group. It is peculiar among U.S. *Dichanthelium* taxa for not producing autumnal inflorescences; at least none has ever been seen or collected, not even during visits to 48 *D. nudicaule* sites from 1995–1999 by B.A. Sorrie and myself. However, *D. nudicaule* branches from the base and lower nodes, with the axillary branches persistent and the lower portions of previous-year culms at least sub-persistent. These character states suggest an affinity with *Dichanthelium* taxa found in the tropics and South America. Floral dimorphism in *Dichanthelium* taxa is often absent in tropical America, and “[m]ain and axillary culms are persistent in Mesoamerican and South American species” while “only the rosette usually persists” in North American species (Zuloaga et al. 1993). Basal branching and numerous elongate basal leaves also suggest an affinity with such taxa as *D. laxiflorum* and *D. strigosum*, both of which occur in North America and Mesoamerica.

Distribution and habitat.—*Dichanthelium nudicaule* is known only from northwestern Florida, southern Alabama, and southern Mississippi, where it occurs in saturated areas of pitcher plant bogs (especially at the bases of seepage slopes) and boggy ecotones between wet savannas and cypress streamheads.

Representative specimens: **ALABAMA. Baldwin Co.:** Gateswood, 1 May 1903, *S.M. Tracy* 8432 (GH); Lilian Swamp, on tree stump along west bank of south fork of Caney Bayou, directly south of confluence with north fork, 18 Sep 1980, *M. Lelong* N532 (USA). **Mobile Co.:** pitcher plant bog along Rte 59, 0.5 mi N of Fowl River, 24 Apr 1972, *M. Lelong* 6492 ((NCU, USA, VDB). **FLORIDA. Bay Co.:** mucky sand of grass savanna between Sand Creek Rd and Mule Creek, ca. 8.5 air mi ESE of Callaway, 9 May 1995, *L.C. Anderson* 15473 (FSU). **Santa Rosa Co.:** Blackwater River swamp, May 1886, *A.H. Curtiss* 3583B (US, holotype). **Walton Co.:** Eglin Air Force Base, New Home Bogs, 17 May 1996, *B.A. Sorrie* 8812 (GA, NCU). **MISSISSIPPI. Greene Co.:** sphagnum bog ca. 2 mi S of State Line, 5 Jun 1980, *K.L. Fordon* 1903 and *J. Burris* (IBE). **Harrison Co.:** DeSoto National Forest, pitcher plant bogs, Tuxachanie Trail, 4 May 1974, *K.E. Rogers* 9537-A (NCU). **Stone Co.:** University of Mississippi Forest Lands, seepage bog at headwaters of Little Railroad Creek, 16 May 1997, *B.A. Sorrie* 9226 (GH, NCU).

10. *Dichanthelium sphagnicola* (Nash) R.J. LeBlond, comb. nov. *Panicum sphagnicola* Nash, Bull. Torrey Bot. Club 22:422. 1895. TYPE: U.S.A. FLORIDA: COLUMBIA CO.: sphagnum bog, Lake City, 29–31 Aug 1895, *Nash* 2500 (LECTOTYPE: NY; ISOLECTOTYPES: NY, US!)

Soon reclining, *Dichanthelium sphagnicola* is similar in aspect to *D. lucidum*, but it has longer spikelets and first glumes that are typically pubescent and has smooth fertile lemmas. A few specimens from Florida have glabrous to

glabrate spikelets and weakly papillose fertile lemmas, suggesting intergradation with *D. lucidum*. However, even these are readily separated from *D. lucidum* based on spikelet and glume lengths and the nearly smooth fertile lemmas. Hitchcock and Chase (1910) describe the autumnal habit of *D. lucidum* as “much more slender, more leafy, and bright green and shining” compared with *D. sphagnicola*.

Distribution and habitat.—*Dichanthelium sphagnicola* is restricted to southeast Georgia and northern to south-central Florida. Although included in synonymy with *Panicum dichotomum* by Radford et al. (1968), no specimen has yet been seen from North or South Carolina. It is found along edges of cypress swamps, in sphagnous bogs, and similar moist, shady places (Hitchcock & Chase 1910).

Representative specimens: **FLORIDA. Columbia Co.:** Lake City, 29/31 Aug 1895, *G.V. Nash* 2500 (lectotype, US). **Levy Co.:** fertile black flat woods near ponds, Bronson, 6 Sep 1898, *R. Combs* 838 (US). **Volusia Co.:** sandy bank along road about 10 mi SW of Daytona Beach, 24 Oct 1940, *W.A. Silveus* 6726 (US). **GEORGIA. Chatham Co.:** river swamp near Chatham Tower, 14 May 1940, *D.E. Eyles* 5628 (US).

11. *Dichanthelium yadkinense* (Ashe) Mohlenbr., *Erigenia* 6:27. 1985. *Panicum yadkinense* Ashe, *J. Elisha Mitchell Sci. Soc.* 16:85. 1900 (nom. nov.). *Panicum maculatum* Ashe, *J. Elisha Mitchell Sci. Soc.* 15:44. 1898, nom. illegit., not Aublet 1775. *Panicum dichotomum* L. var. *yadkinense* (Ashe) Lelong, *Brittonia* 36:266. TYPE: U.S.A. NORTH CAROLINA: WAKE CO.: Raleigh, May 1895, *Ashe* s.n. (LECTOTYPE: US!).

The combination of beardless nodes, large vernal blades (to 15 mm wide), and acute spikelets 2.1–2.6 mm long are definitive. When present, the large yellowish glandular “warts” on the (usually upper) sheaths are also helpful. However, they are often absent and occasionally occur on other *Dichotoma* group taxa (notably *D. dichotomum* var. *nitidum*). Within an inflorescence, some spikelets may be blunt apically, but many or most will be acute, with the second glume and sterile lemma surpassing the fertile lemma by as much as 0.5 mm. These characters, combined with no observed intergradation with other *Dichotoma* taxa, have led to recognition here at species rank. However, care must be taken not to confuse *D. yadkinense* with the superficially similar *D. cryptanthum* (Ashe) R.J. LeBlond ined., which has a similar appearance and acute spikelets of similar length, but with a membranous ligule (vs. hairy) and a scabrous peduncle and panicle axis (vs. smooth in *D. yadkinense*).

Distribution and habitat.—*Dichanthelium yadkinense* is reported from New Jersey to Michigan and south to Georgia and Texas (AL, DC, DE, GA, IL, IN, KY, LA, MD, MI, NC, NJ, OH, PA, SC, TN, TX, VA, WV). It also occurs in Mexico (Hitchcock & Chase 1915). This species appears to be scattered throughout most of its range, though there are 22 counties of occurrence in North Carolina. *Dichanthelium yadkinense* is found in floodplain forests, thickets, bottomlands, and swamps, often on alluvial deposits.

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