

## Report of *Andropogon hallii* in Missouri and Updated Regional Key to the Genus

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ABSTRACT. — Taxonomic and ecological information are reported for the first collections of *Andropogon hallii* Hack. in Missouri. An updated key to Missouri species of *Andropogon* is provided.

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### INTRODUCTION

*Andropogon hallii* Hack., commonly known as sand bluestem, is a perennial, warm-season grass similar in general appearance to the more widespread *Andropogon gerardii* Vitman. *Andropogon hallii* occurs in dry, sandy soils throughout the Great Plains ecoregion, overlapping in range with *A. gerardii* (Kartesz 2015). Where the two species overlap, *A. gerardii* occupies lower, wetter habitats than *A. hallii*, but hybrids occur in intermediate and nearby disturbed habitats (Romberg 1954, Barnes 1986). The entities in this complex have been treated as varieties (Gould 1975), subspecies (Wipff 1996), or species (Fernald 1950, Hitchcock & Chase 1951, Campbell 2003). Although the two entities can sometimes hybridize under natural conditions, they seem morphologically, ecologically, and geographically distinct enough to be considered discrete species. Barkworth et al. (2007) and Kartesz (2015, citing Barkworth et al. [2007]) included Missouri within the range of *A. hallii* without citation of any specimens, but the most recent floristic works for Missouri (Yatskievych 1999, Ladd & Thomas 2015) as well as geographically broader floras (e.g. Campbell 2003) excluded *A. hallii* from the state.

A recent review of Missouri material labeled as *A. gerardii* at the Missouri Botanical Garden yielded several specimens that key to *A. hallii* based on the density and color of inflorescence hair, length of awns, and presence of a glaucous coat on the foliage. These populations were all collected within a few kilometers of each other in Buchanan county, in an area where a levee of the Missouri River had recently been breached, depositing sand in agricultural fields. Associates listed at this location on Yatskievych et al. 00-74 include *Salix* sp., *Populus* sp. (presumably *P. deltoides* W. Bartram ex Marshall), *Schoenoplectus* sp., *Sporobolus* sp. (presumably *S. cryptandrus* (Torr.) A. Gray), *Triplasis* sp. (presumably *T. purpurea* (Walter) Chapm.), and *Cenchrus* sp. (presumably *C. longispinus* (Hack.) Fernald).

Another population at Missouri Mines State Historic Site in St. Francois County (Fig. 1) was found by the author and later verified by Missouri State Park staff (McCarty & Meinert 2012, Ron Colatskie pers. comm.). This population apparently was planted as part of a bioremediation effort and has persisted and spread sporadically throughout the sandy chat piles at the area.

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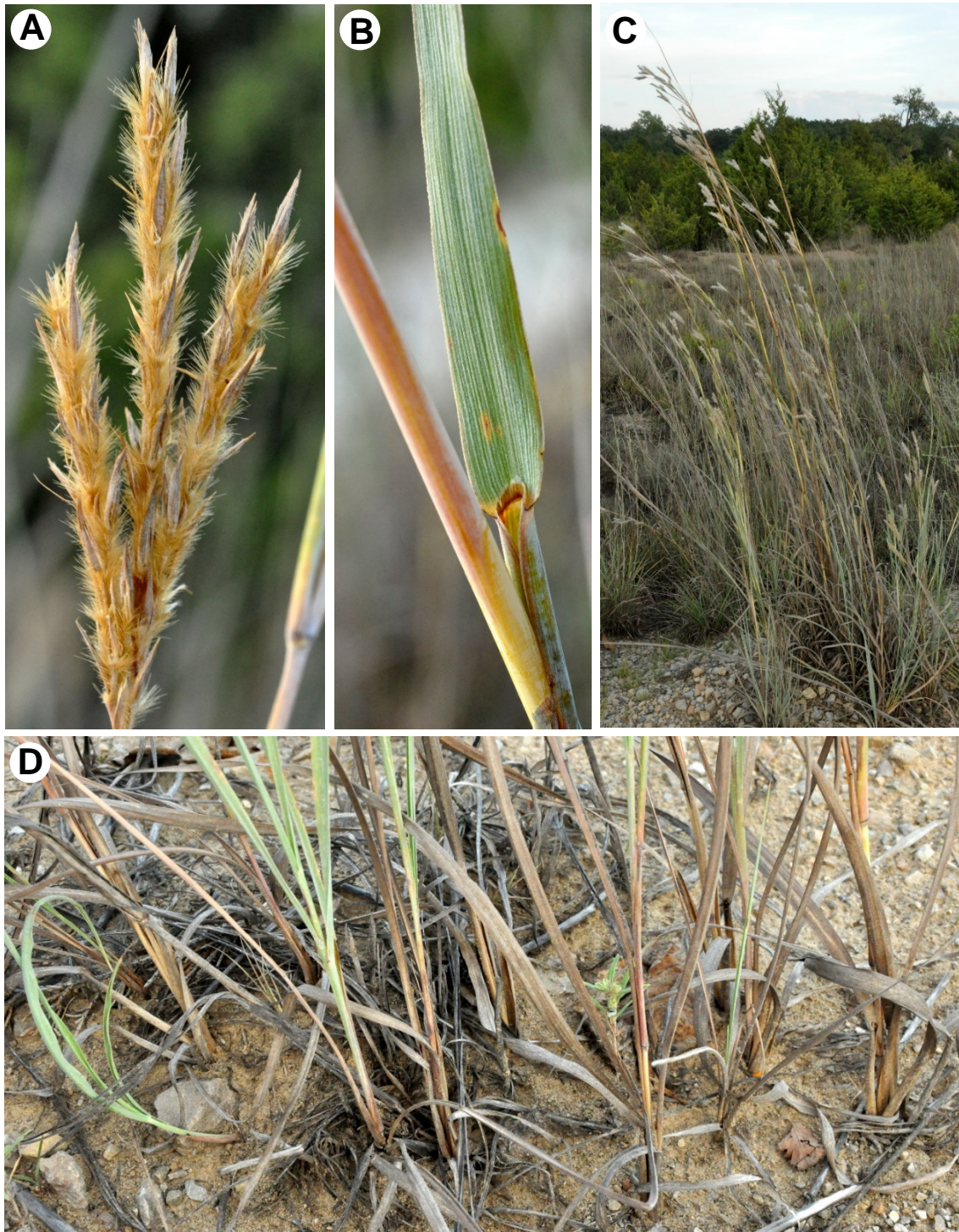
*Voucher specimens:* **U.S.A. MISSOURI:** BUCHANAN CO.: south side of dirt road, 0.3 mi west of junction with U.S. Highway 59, ca. 1.75 mi southwest of Rushville; open area of deep sand with scattered swales; scattered large clumps, plants strongly bluish-glaucous; with *Salix*, *Populus*, *Schoenoplectus*, the higher areas with *Sporobolus*, *Triplasis*, *Cenchrus*, elevation 790 feet, NW1/4 sec. 22 T55N R37W; 18 July 2000, *Yatskievych et al.* 00-74 (MO). 0.5 mi west of Highway 59, north 1 mi, N of Highway 59/45 intersection, sand deposits along county road; sec. 21 T55N R37W; 31 August 2000, *Nagel s.n.* (MO). ca. 3 mi east of Winthrop; sandy soil along roadside; NW1/4 sec. 21 T55N R37W; 1 August 2001, *Powelson s.n.* (MO). ST. FRANCOIS CO.: Missouri Mines State Historic Site, 15S 719147, 14190610, 23 July 2019, *Braun 20190723.01* (MO).

## DISCUSSION

Propagules establishing the Buchanan county populations may have arrived via floodwaters when the levee was breached or may have spread from an unknown population nearby after the water had receded. Whatever the means of arrival, these populations should be considered a native part of Missouri's flora, as are other edge-of-range Great Plains species associated with dry, sandy, alluvial habitats in northwest Missouri (i.e. *Dalea leporina* (Aiton) Bullock, *Cyperus schweinitzii* Torr., etc.). The St. Francois County population, however, was introduced on an anthropogenic substrate, and can therefore not be considered a native occurrence.

Botanists in neighboring Kansas (Freeman 2014) and Nebraska (Rolfmeier and Steinauer 2013) assigned *A. hallii* a coefficient of conservatism of five, and Drobney et al. (2001) assigned seven to *A. hallii* in Iowa. A moderate coefficient of conservatism seems reasonable for Missouri's ecological checklist as well. Other areas with dry, sandy soils (especially in northwest Missouri and along stabilizing sand bars associated with large river systems) should be searched for additional populations of *A. hallii*.

Yatskievych (1999) reported *A. gerardii* var. *chrysocomus* in Missouri and discussed the taxonomic confusion in the *A. gerardii* complex. The Missouri specimens labeled as *A. gerardii* var. *chrysocomus* at the Missouri Botanical Garden appear to be normal or somewhat hairier forms of typical *A. gerardii*. It seems that this name has been applied variously to hybrids between *A. gerardii* and *A. hallii* (Wipff 1996) or differently hairy forms of either species. Further collection and study of aberrant *A. gerardii* is encouraged to better understand the status of this entity in Missouri. Collections of purported *A. gerardii* var. *chrysocomus* or *A. hallii* should include multiple culms with intact rhizomes, as this can be an important feature in determination.



**Figure 1.** *Andropogon hallii*, St. Francois County, Missouri; **A:** inflorescence showing the short or absent awns and the densely pubescent spikelets; **B:** culm, sheath, ligule, and blade; **C:** habit; **D:** widely spaced culms showing the rhizomatous habit. Photos by author.

Yatskievych (1999) is the most up-to-date regional flora including *Andropogon*. Since 1999, two new additions to the *Andropogon* of Missouri have been discovered: *A. hirsutior* (Thomas 2017) and *A. hallii* reported here. An updated key is provided below to accommodate these recent additions.

#### KEY TO MISSOURI TAXA OF *ANDROPOGON*

1. Culms not strongly keeled, elliptic to round in cross section; pedicellate spikelet staminate.... **2**
  2. Stems strongly glaucous; awn of sessile spikelet <6 mm long or absent; rhizomatous; inflorescences densely long-villous (somewhat obscuring the inflorescence rachis) with white to yellow hairs; ligule >2.5 mm long..... ***A. hallii* Hack.**
  2. Stems not or somewhat glaucous; awn of sessile spikelet present, >6 mm long; not rhizomatous; inflorescences not densely hairy (inflorescence rachis not or only barely obscured); ligule <2.5 mm long..... ***A. gerardii* Vitman**
1. Culms strongly keeled, appearing flattened; pedicellate spikelet sterile..... **3**
  3. Sessile spikelets 6–7 mm long; peduncles exerted far beyond the subtending raceme sheaths; young vegetative sheaths with red coloration, not so strongly folded so as to make finding the ligule difficult..... ***A. ternarius* Michx.**
  3. Sessile spikelets 4–5 mm long; peduncles usually shorter than the subtending raceme sheaths (sometimes exerted far beyond the raceme sheaths in *A. gyrans*); young vegetative sheaths red or green with red at the very base, strongly folded so as to make finding the ligule difficult..... **4**
    4. Mature culms rusty colored, the uppermost nodes (just below the inflorescence) densely hairy with upward-pointed hairs, young vegetative sheaths red and green; raceme sheaths often greatly inflated, hiding the racemes; peduncles sometimes strongly exerted beyond the subtending raceme sheaths; lemmas of sessile spikelet usually with a kink or twist 2–4 mm beyond the glume.... ***A. gyrans* Ashe**
    4. Mature culms orange-tan colored, the uppermost nodes glabrous or occasionally hairy with upward pointing hairs, young vegetative sheaths light green with red at the very base; raceme sheaths not greatly inflated; peduncles shorter than the subtending raceme sheaths; lemmas of sessile spikelet more or less straight..... **5**
      5. Mature culm sheaths usually not antrorsely scabrous; inflorescence relatively simple or few-branched, not appearing bushy; membranaceous part of ligule <1 mm long; common throughout southern Missouri (Ozarks, Osage Plains, Coastal Plain, less common north of Missouri River) in dry or moist habitats..... ***A. virginicus* L.**
      5. Mature culms sheaths usually antrorsely scabrous (sometimes barely so); inflorescence compound, appearing bushy; membranaceous part of

ligule 0.7–1.2 mm long; uncommon in Coastal Plain and Osage Plains in moist habitats..... *A. hirsutior* (Hack.) Weakley & LeBlond

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