Andropogon hirsutior

Hairy Beardgrass

Poaceae

Andropogon hirsutior by Christa F. Hayes, 2023

***Andropogon hirsutior* Rare Plant Profile**

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
Forests & Natural Lands
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Life History

Andropogon hirsutior (Hairy Beardgrass) is a perennial grass that forms dense tufts. During the early part of the growing season the leaves are primarily basal but late in the summer a flowering stem emerges and develops rapidly. The culms are 1–2 meters tall. The leaves have green blades and scabrous (rough) sheaths that are usually adorned with long, soft hairs. *A. hirsutior* flowers in the fall. The inflorescence can vary from linear to oblong in shape. The axis of the inflorescence (rachis) is conspicuously hairy. The peduncles are short (3–8 mm but usually less than 5) and they are subtended by sheaths that often surpass them in length. *Andropogon* produces spikelets in pairs; one sessile and one pedicellate. In *A. hirsutior* the sessile spikelet is bisexual and the other spikelet is either stunted or absent and represented only by a pubescent pedicel. The sessile spikelet has a pair of keeled glumes that enclose two florets, the lower of which is sterile and reduced to a membranous lemma. The upper floret is long-awned and fertile, and the mature fruits are purple or brown. (See Fernald 1950, Hitchcock 1950, Campbell 1983a & 2021, Weakley et al. 2020 & 2024).


Christa Hayes, 2023.


Keith Bradley, 2015.


Theo Witsell, 2022.

Many *Andropogon* species are morphologically similar so a combination of careful field study and complete specimens of mature plants are needed for certain identification (Campbell 2021). Particularly troublesome are those in the group that Campbell (1983a) referred to as the *virginicus* complex, which are set apart by having one stamen instead of three. A number of them occur in New Jersey, including *A. glomeratus, A. gyrans* (aka *A. elliottii*), and *A. virginicus*. *A. gyrans* has broad, overlapping culm sheaths and the sheaths of *A. virginicus* are not scabrous; furthermore, both of those species tend to occur in dryer habitats. *Andropogon hirsutior* is most similar to *A. glomeratus*, which also grows in wet places. The short peduncles can help to distinguish *A. hirsutior*: Those of *A. glomeratus* are typically much longer (11–35 mm), although a range of 4–60 mm is possible. Additionally, the withered anthers of *A. hirsutior* are often retained in the spikelets while those of *A. glomeratus* are not (Campbell 1983a, Weakley et al. 2020 & 2024). Although some members of the *virginicus* complex regularly co-occur, the species appear to be reproductively isolated so their identification is not likely to be further complicated by the presence of hybrids (Campbell 1983a, Weakley et al. 2011).

Pollinator Dynamics

Campbell (1982) indicated that *Andropogon* species in the *virginicus* complex consistently flower at dawn or shortly thereafter. Wind is the prevalent mechanism for cross-fertilization of grasses (Culley et al. 2002) and some *A. hirsutior* flowers are wind-pollinated. However, the reduced number of stamens in the *virginicus* complex is indicative of a capacity for cleistogamy (Campbell 1983a). Cleistogamous flowers remain closed and are self-fertilized. The majority of *Andropogon hirsutior* flowers (nearly 60%) are cleistogamous: Their reproductive organs are reduced in size and their peduncles do not elongate so they remain enclosed within the sheaths. In contrast, the peduncles of chasmogamous (outcrossing) flowers are longer and may continue to grow as the flowers expand (Campbell 1982).

Cleistogamy can result in significantly higher seed set in *Andropogon*, and it reduces fruit losses from insect predation (Campbell et al. 1983). The strategy has likely reinforced the reproductive isolation of species in the *virginicus* complex (Campbell 1982, 1983a).

Seed Dispersal and Establishment

When *Andropogon* fruits are ripe the inflorescence breaks apart into units that include the fertile spikelet, the pedicel of the undeveloped spikelet, and piece of the rachis. The hairs on the rachis and pedicel spread horizontally, forming a plume that allows the wind to transport the small, lightweight seed. Although most *Andropogon* seeds do not travel far from the parent plants, they can be dispersed over very long distances when winds are high and humidity is low (Campbell 1983b). Dispersal of the fruits from cleistogamous flowers may be delayed until the sheaths break apart, but eventually those spikelets fall free and can be distributed in the same manner as the typical seeds (Campbell et al. 1983).

The awns of *Andropogon* species in the *virginicus* complex are usually twisted at the base, which could be indicative of hygroscopy. A hygroscopic awn bends or stretches in response to changes in humidity, helping to push the associated seed into the soil. The strategy is most effective in awns that are tightly coiled when they are dry (Jung et al. 2014). *Andropogon* awns generally have a moderate twist, so they are probably only weakly hygroscopic (Campbell 1983a).

No information was found regarding the germination requirements of *Andropogon hirsutior*, although Campbell (1982, 1983a) observed that all of the *Andropogon* species with cleistogamous flowers—and *A. hirsutior* in particular—were highly successful colonizers of disturbed habitats. *A. hirsutior* seedlings exhibit the rough, pubescent stems that are typical of the species when they are just a few weeks old, although those characteristics may be absent in greenhouse-grown plants (Campbell 1983a). The plants can reach reproductive maturity by the end of their first or second year (Campbell 1983b). Studies of related species (*A. callipes*, *A. gerardii*, *A. virginicus*) indicated that they were mycorrhizal, or at least facultatively so (Wang and Qiu 2006).

Habitat

Andropogon hirsutior can be found in a variety of open, wet habitats. On a scale of 1 to 9, Weakley et al. (2024) assigned the species a heliophily ranking of 9, signifying that it is essentially a sun obligate. The sites where *A. hirsutior* was documented in New Jersey were characterized as wet meadows (NJNHP 2024). Habitats throughout other parts of the beardgrass's range include bogs, flatwoods, marshes, pocosins, prairies, savannas, swales, swamps, and Carolina Bays (Hurt and Winstead 1980, Campbell 1983a, Orzell and Bridges 2006a, Wall 2007, Carr et al. 2010, Thornhill et al. 2014, Schmalzer and Foster 2016, Weakley et al. 2020). Weakley et al. (2020) indicated that *A. hirsutior* could be found in areas with active seepage or areas with no evident seepage. Florida prairie habitats range from dry-mesic to wet-mesic (Orzell and Bridges 2006b), and in one Arkansas prairie it was noted that the site was seasonally wet and could dry up completely during extreme droughts (Baecher et al. 2018). *A. hirsutior* has also been known to grow along the margins of brackish marshes and in saline barrens (Weakley et al. 2020, Soteropoulos et al. 2022).

Andropogon hirsutior was identified as a characteristic species of Wet Loamy Pine Savannas in North Carolina (Sorrie et al. 2006) and of Twig-rush Peat Mats in Delaware (Largay and Sneddon 2009). In Maryland, Hairy Beardgrass was listed as a representative species of Delmarva Poor Fens (Harrison and Knapp 2010). Additional community types specified in North Carolina included Wet Sandy Pine Savannas and Sandhill/Streamhead Pocosin Ecotones (Sorrie et al. 2006). Graminoid species are prevalent in most of the habitats where *A. hirsutior* occurs, and woody species are generally scarce.

Andropogon hirsutior can also establish, and even thrive, in an assortment of anthropogenic habitats. Examples include semipermanent impoundments, borrow ponds, ditches, abandoned farm fields or homesteads, roadsides, parking areas, and other disturbed areas (Sorrie et al. 2006, Schmalzer and Foster 2016, Soteropoulos et al. 2022, Weakley et al. 2024). Campbell (1983a) noted that the grass often formed large populations in recently cleared sites on low ground. In Arkansas, *A. hirsutior* was one of the dominant species on a poorly drained old field that was subjected to periodic floods (Soteropoulos et al. 2022).

Wetland Indicator Status

Andropogon hirsutior is a facultative wetland species, meaning that it usually occurs in wetlands but may occur in nonwetlands (U. S. Army Corps of Engineers 2020).

USDA Plants Code (USDA, NRCS 2024)

The code for *Andropogon hirsutior* is ANHI, but the USDA currently uses the synonym *A. glomeratus* var. *hirsutior* (code ANGLH).

Coefficient of Conservancy (Walz et al. 2020)

CoC = 8. Criteria for a value of 6 to 8: Native with a narrow range of ecological tolerances and typically associated with a stable community (Faber-Langendoen 2018).

Distribution and Range

The global range of *Andropogon hirsutior* is restricted to the southeastern United States (POWO 2024). The map in Figure 1 depicts the extent of the species in North America. Until recently, the grass was thought to reach the northern end of its range in Maryland (Weakley et al. 2020). In New Jersey, *A. hirsutior* is only known from Cape May County (Figure 2).

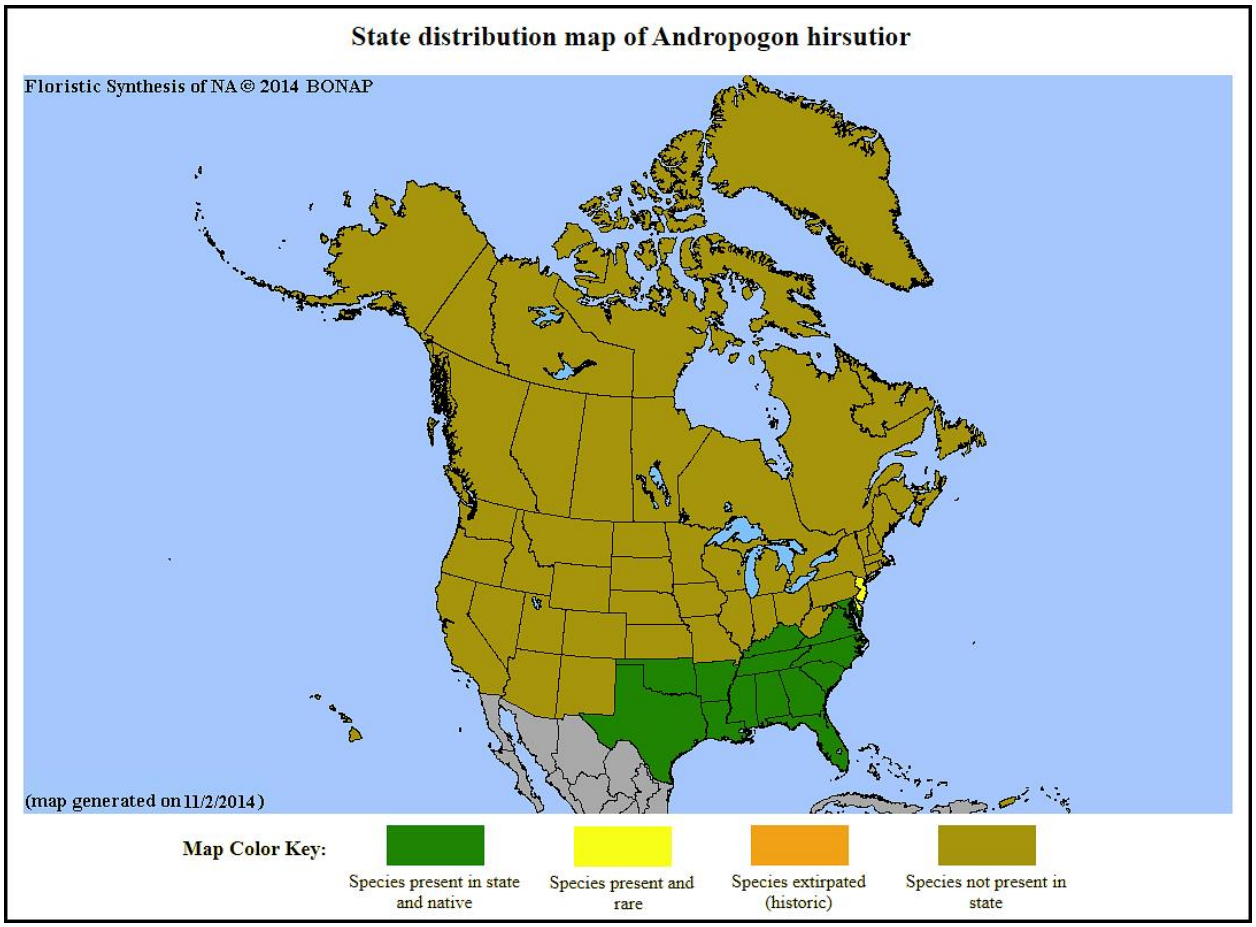

Figure 1. Distribution of A. hirsutior in North America, adapted from BONAP (Kartesz 2015).

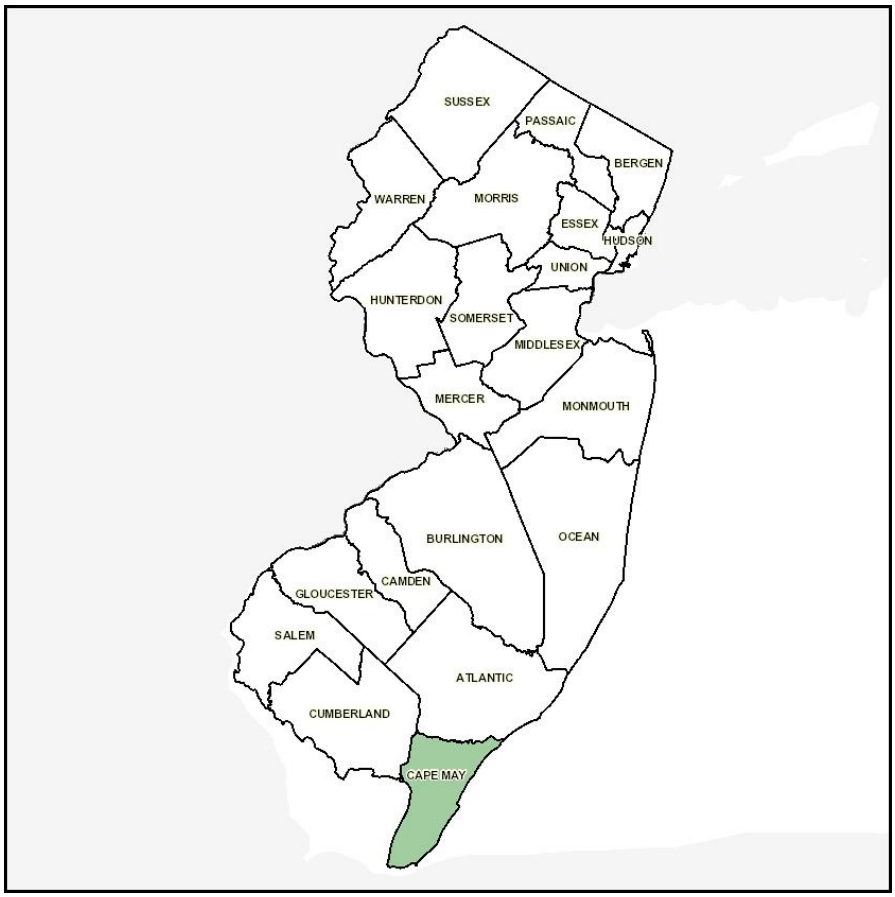

Figure 2. County records of A. hirsutior in New Jersey (source data from NJNHP 2022).

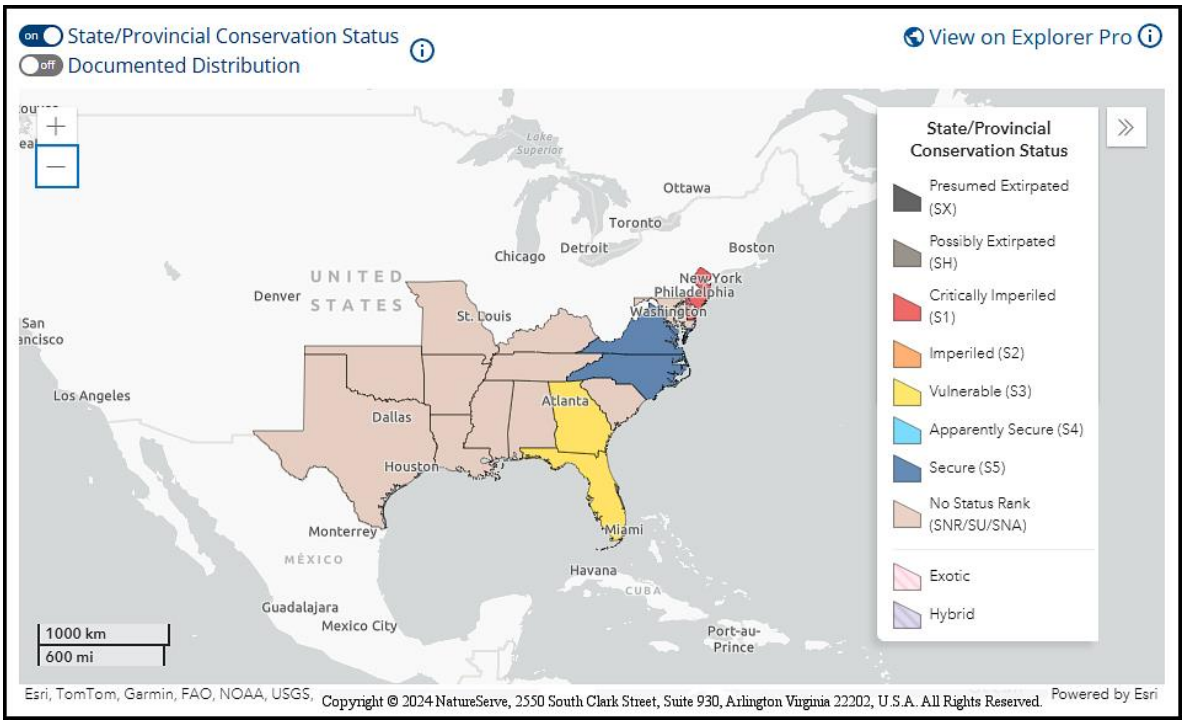

Figure 3. Conservation status of A. hirsutior in North America (NatureServe 2024).

Conservation Status

Andropogon hirsutior is considered globally secure. The G5T5 rank means the taxon has a very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats (NatureServe 2024). The map above (Figure 3) illustrates the conservation status of *A. hirsutior* throughout its range. The grass is vulnerable (moderate risk of extinction) in two states and critically imperiled (very high risk of extinction) in two states. In other parts of its range Hairy Beardgrass is secure or unranked.

New Jersey is one of the states where *Andropogon hirsutior* is critically imperiled (NJNHP 2024). The S1 rank signifies five or fewer occurrences in the state. A species with an S1 rank is typically either restricted to specialized habitats, geographically limited to a small area of the state, or significantly reduced in number from its previous status. *A. hirsutior* has also been assigned a regional status code of HL, signifying that the species is eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

There are only two documented records of *Andropogon hirsutior* in New Jersey. A specimen was collected by Otway Brown in 1942 but that population has not been seen since. In 2020 the grass was discovered at another location in the same township where it was first collected. It is not clear whether *A. hirsutior* was planted at the new site as part of a restoration project, but the historic record supports the probability that it is a natural occurrence (NJNHP 2024).

Threats

New Jersey's *Andropogon hirsutior* population is not currently facing any known threats. The site where it grows is being managed in a way that is likely to benefit the species (NJNHP 2024). Fire suppression has been noted as a threat to *A. hirsutior* in several other states because many of the natural communities that support occurrences have historically been maintained by burning (Campbell 1983a, Carr et al. 2010, Harrison and Knapp 2010).

The reproductive success of *Andropogon hirsutior* can be hampered by smut fungi or insect predation (Campbell 1983b), although as previously noted insect damage is reduced in cleistogamous inflorescences. One insect reported on *A. hirsutior* was *Cyrpoptus reineckei*, a grass-feeding planthopper (Wilson and Wheeler 2010). *C. reineckei* reaches the northern end of its range in North Carolina (BugGuide 2024). While planthoppers can cause some damage to their host plants they are generally not regarded as a serious concern (Dozier 1922). Smut fungi, in contrast, can be very harmful to graminoids. Campbell (1983b) noted that *Sorosporium* is a particular problem for North American beardgrasses. The majority of *Sorosporium* species attack the inflorescences of their hosts, replacing their reproductive organs with spores (Zundel 1930, Clay 1991). The type locality for one—*Sorosporium ellisii*—is Newfield, New Jersey, where it was collected on *Andropogon virginicus* in 1880 (Jackson 1908).

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Andropogon hirsutior* population to climate change. The species was assigned a rank from NatureServe's Climate Change Vulnerability Index using the associated tool (Version 3.02) to estimate its exposure, sensitivity, and adaptive capacity to changing climactic conditions in accordance with the guidelines described by Young et al. (2016) and the state climactic computations by Ring et al. (2013). Based on available data *A. hirsutior* was assessed as Moderately Vulnerable, meaning that it is likely to show some decrease in abundance or range extent in New Jersey by 2050.

Some of the effects of changing climactic conditions in New Jersey include higher temperatures, shifting precipitation patterns that increase the frequency and intensity of both droughts and floods, and rising sea levels along the coast (Hill et al. 2020). Because New Jersey's only extant population of *Andropogon hirsutior* is located in close proximity to the coast it is particularly vulnerable to rising sea levels as the climate continues to warm. The site where the beardgrass is currently growing is likely to become increasingly saline and experience more frequent flooding. Tidal surges of 6–9 feet can be expected from a Category 1 storm, and less than a foot of sea level rise could result in permanent inundation (NJ Adapt 2024). The existing threat to New Jersey's coastal communities from the invasive Common Reed, *Phragmites australis* ssp. *australis*, is also likely to significantly increase as a result of climate change (Mozdzer and Megonigal 2012, Tougas-Tellier et al. 2015, Eller et al. 2017).

Nevertheless, *Andropogon hirsutior* might have some capacity to adapt. Although the extent of the species' tolerance for salinity and environmental extremes is unknown it has occasionally been documented in slightly saline habitats and in wetlands that dry up during periods of drought. *A. hirsutior* may be able to respond to climate change by colonizing new sites as the location where it occurs becomes less suitable—the grass has a proven ability to disperse and establish in disturbed habitats. As a southern species *A. hirsutior* is likely to be capable of withstanding higher temperatures, so it may also have the potential to expand its range northward.

Management Summary and Recommendations

No management needs have been identified for the extant population of *Andropogon hirsutior* in New Jersey. Nearly 80 years passed between the first and second observations of Hairy Beardgrass in the state, and it seems plausible that there could be undiscovered occurrences. *A. hirsutior* closely resembles *A. glomeratus*, which is common in southern New Jersey and has similar habitat preferences, so some populations may have been overlooked. *A. hirsutior* might also become more frequent at the northern end of its range as a result of global warming. Narrowly focused searches will probably be needed in order to detect new occurrences.

Synonyms

The accepted botanical name of the species is *Andropogon hirsutior* (Hack.) Weakley & LeBlond. Orthographic variants, synonyms, and common names are listed below (POWO 2024). The recognition of *A. hirsutior* as a distinct species was fairly recent (Weakley et al. 2011) and a number of sources still use the name *A. glomeratus* var. *hirsutior* (e.g. Campbell 2021, ITIS 2024, NatureServe 2024, USDA NRCS 2024). Some older manuals (e.g. Fernald 1950, Hitchcock 1950) listed the species as *A. virginicus* var. *hirsutior*.

Botanical Synonyms	**Common Names**
Andropogon glomeratus var. *hirsutior* (Hack.) C. Mohr	Hairy Beardgrass
Andropogon macrourus var. *hirsutior* Hack.	Hairy Bluestem
Andropogon virginicus f. *hirsutior* (Hack.) Fernald & Griscom	Hairy Bush Bluestem
Andropogon virginicus var. *hirsutior* (Hack.) Hitchc.	

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