

# *Carex planispicata*

Narrow-leaf Sedge

Cyperaceae



*Carex planispicata* by Pat Deacon, 2023

## ***Carex planispicata* 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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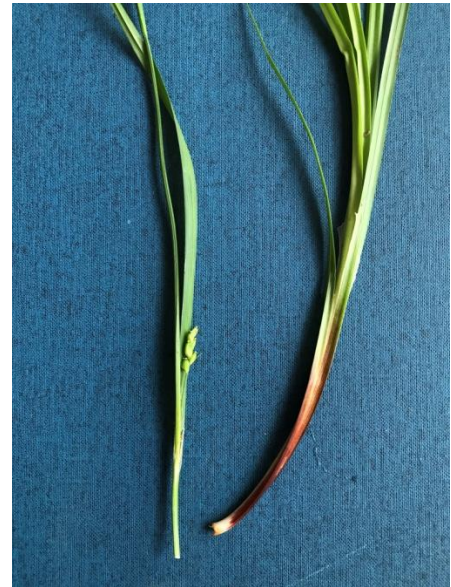
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## Life History

*Carex planispicata* (Narrow-leaf Sedge) is a rhizomatous perennial sedge, one of seven species in *Carex* Section Griseae that is found in New Jersey (Naczi 2009, Kartesz 2015). The defining characteristics of sedges in that section include red-purple or brown coloration at the base of the culms, narrow leaves with smooth blades, staminate terminal spikes and pistillate or mixed lateral spikes, rough-awned pistillate scales, perigynia with numerous impressed veins, three stigmas, and trigonous achenes with deciduous styles. Only four of the Section Griseae species in New Jersey are red-purple at the base of the culms, the other three (*C. conoidea*, *C. glaucodea*, and *C. hitchcockiana*) are dark brown or yellow-brown. The basal coloration is most noticeable on *Carex planispicata* (extending for 5.5–9.6 cm) and *C. oligocarpa* (extending for 3.2–8.8 cm). On the other two species (*C. amphibola* and *C. grisea*) the reddish coloring usually extends less than 3 cm up the stem; they also differ in having spirally arranged spikelets whereas the spikelets of *C. planispicata* and *C. oligocarpa* are two-ranked (Naczi and Bryson 2020).



Pat Deacon, 2023.



Vanessa Voelker, 2021.

*Carex planispicata* has short rhizomes and usually forms dense tufts. Bailey (1889) described the plants as rigid. The reproductive and vegetative shoots are approximately equal in height and generally under 6 dm tall. The leaf blades are smooth and 3.5–6.5 mm wide. The culms are less than 1 mm in width and mostly smooth, although they can sometimes be slightly rough near the top. In addition to the terminal staminate shoot there are 2–5 lateral pistillate shoots subtended by long, leaflike bracts. Each of the pistillate spikes has 5–14 essentially beakless perigynia with numerous (57–69) veins that are typically 4.2–4.9 mm long and 1.6–1.8 mm wide. The achenes are tightly enclosed in the perigynia. They are obovoid, 2.8–3.7 long by 1.3–1.7 mm wide, and have small basal stalks (stipes) and short, straight beaks (Naczi 1999, Naczi and Bryson 2020).

Fruiting plants are most likely to be found from mid-May through early June (Lea and Frye 2002, Weakley et al. 2024). One year *C. planispicata* plants in New Jersey were seen in full fruit at the end of the first week in June but another year most of the fruits had already been dispersed by that date (NJNHP 2024).

Analyses of morphological and molecular characters suggest that *Carex planispicata* is most closely related to *C. thornei*, *C. paeninsulae*, and *C. bulbostylis*, none of which occur in New Jersey (Naczi et al. 2002, Naczi 2009, Starr et al. 2009). Before *Carex planispicata* was identified as a distinct species it was often confused with *C. amphibola* or *C. grisea* but key differences are noted in the first paragraph of this section. Occurrences of *C. planispicata* in the state are most likely to be confused with *C. oligocarpa*, particularly since the two species share habitat and sometimes intermingle (although the latter sedge tends to grow farther upslope). The perigynia of *Carex oligocarpa* are beaked, and that species usually has fewer perigynia and slightly narrower leaves (Naczi 1999, Naczi and Bryson 2020).

### **Pollinator Dynamics**

Most sedges are pollinated by wind although there are a few notable exceptions in scattered genera, including *Carex* (Goetghebeur 1998, Yano et al. 2015). Some typical adaptations to wind pollination in the family include large anthers, long filaments, and prominent stigmas (Zomlefer 1994).

In nearly all sedges, the female flowers develop before the male flowers (protogyny) and the lowest flowers on a spike are the first to mature (Goetghebeur 1998). Both strategies are generally viewed as means of promoting cross-pollination. However, experimentation to test that assumption showed that protogyny was not a particularly effective way of guaranteeing outcrossing in *Carex*, and the species in the study displayed a high degree of self-compatibility (Friedman and Barrett 2009). The authors concluded that protogyny gives wind-pollinated *Carex* species an opportunity to cross-fertilize while self-pollination assures reproductive success.

### **Seed Dispersal**

The fruit of a *Carex* plant is an achene that forms in a sac-like perigynium in which it is eventually dispensed. Most *Carex planispicata* propagules are probably dispersed by gravity. In open sites local dispersal could be aided by wind (Nathan et al. 2008), but distribution over long distances is more likely to be facilitated by animals. The fruits of various *Carex* species are consumed by an assortment of vertebrates (Fassett 1957) and viability has been documented in sedge seeds that were excreted by birds or hoofed mammals, including White-tailed Deer (*Odocoileus virginianus*) (Myers et al. 2004, Leck and Schütz 2005).

No information was found regarding seed longevity or germination in *Carex planispicata*. The majority of sedges are persistent in the seed bank, and in other species of *Carex* larger seed size has been associated with longer dormancy and more successful germination (Leck and Schütz 2005). The propagules of most *Carex* species require a period of stratification at either low or high temperatures (Żukowski et al. 2010) as well as sufficient light (Leck and Schütz 2005) in order to germinate. *Carex* seeds typically sprout underground, producing their first leaf 4–5 days after germination (Alexeev 1988). It is not clear whether *C. planispicata* forms any fungal

associations. Many carices are nonmycorrhizal (Wang and Qiu 2006) and Miller et al. (1999) found no mycorrhizae when they examined *C. amphibola*, which is also in Section Griseae.

### **Habitat**

*Carex planispicata* is usually found in forested sites. Szakacs et al. (2022) determined that the species had a weak association with closed canopies but Weakley et al. (2024) assigned it a heliophily rank of 3, which indicates a relatively strong preference for shade. Typical habitat for *C. planispicata* is mesic to dry woodlands at elevations of 10–800 meters above sea level. The plants are often situated on the lower portions of slopes or in the upper reaches of riparian floodplains (Naczi 1999, Lea and Frye 2002, Fleming and Wofford 2004, Estes 2005, Rhoads and Block 2007, Lynch et al. 2016, Naczi and Bryson 2020, Naczi et al. 2020).

The prevalent canopy species in communities where *Carex planispicata* occurs may include deciduous hardwoods, evergreens, or a mixture of both (Witsell and Baker 2006). For example, *C. planispicata* was recorded in a Longleaf Pine community where fires had been suppressed for 30 years (Brown et al. 2006) but some other habitats were dominated by mixed oak species (Steury et al. 2008, Hoagland and Buthod 2013). Narrow-leaf Sedge is often found growing in loamy soils that are neutral or acidic (Naczi 1999). In the eastern United States it has been documented on shell-middens on the Delmarva Peninsula (McAvoy and Harrison 2012) and on terraces along the Potomac River where mollusk shells had previously been deposited during severe flooding events (Steury et al. 2008). *C. planispicata* has also occasionally been reported in anthropogenic habitats associated with roadways or railroad tracks (Witsell and Baker 2006, Ruch et al. 2014).

### **Wetland Indicator Status**

*Carex planispicata* is not included on the National Wetlands Plant List (NWPL). Any species not on the NWPL is considered to be Upland (UPL) in all regions where it occurs. The UPL designation means that it almost never occurs in wetlands (U. S. Army Corps of Engineers 2022).

### **USDA Plants Code (USDA, NRCS 2025)**

CAPL18

### **Coefficient of Conservancy (Walz et al. 2020)**

CoC = 10. Criteria for a value of 9 to 10: Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance (Faber-Langendoen 2018).

## Distribution and Range

The global range of *Carex planispicata* is restricted to the United States (POWO 2025). The map in Figure 1 depicts the known extent of the species. A report of *C. planispicata* in New England could not be substantiated (Angelo and Boufford 2007).

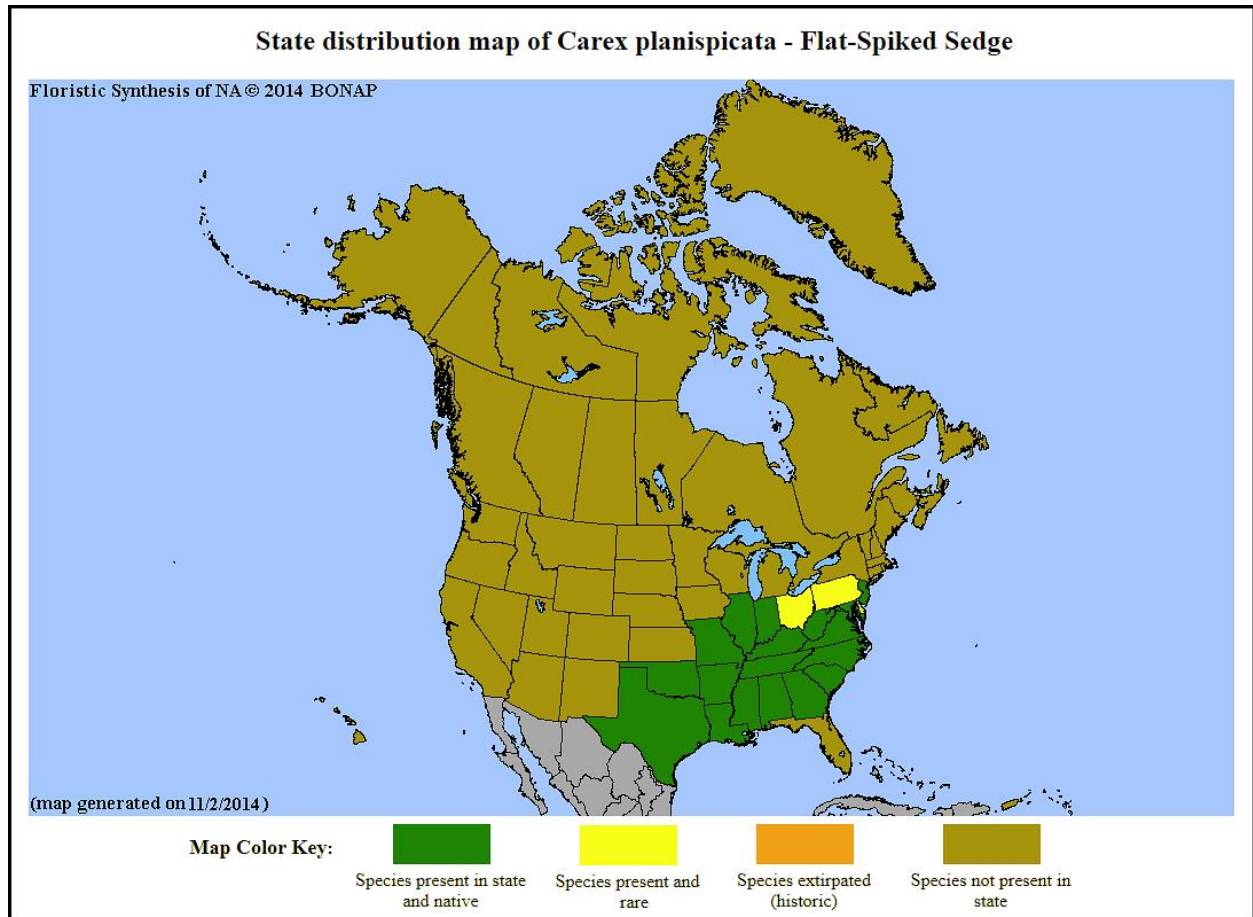


Figure 1. Distribution of *C. planispicata* in North America, adapted from BONAP (Kartesz 2015).

*Carex planispicata* has been documented in two New Jersey counties: Hunterdon and Sussex (Figure 2 below). Two 1950s-era herbarium specimens from Warren County that are labeled with a synonym (*Carex amphibola* var. *rigida*) might also be this species but their identification has not been verified (Mid-Atlantic Herbaria 2025). Fernald (1942) cited material collected in Mercer and Camden counties when he published *C. amphibola* var. *rigida* but both of those specimens were subsequently determined to be another species (Naczi 1999, Mid-Atlantic Herbaria 2025).

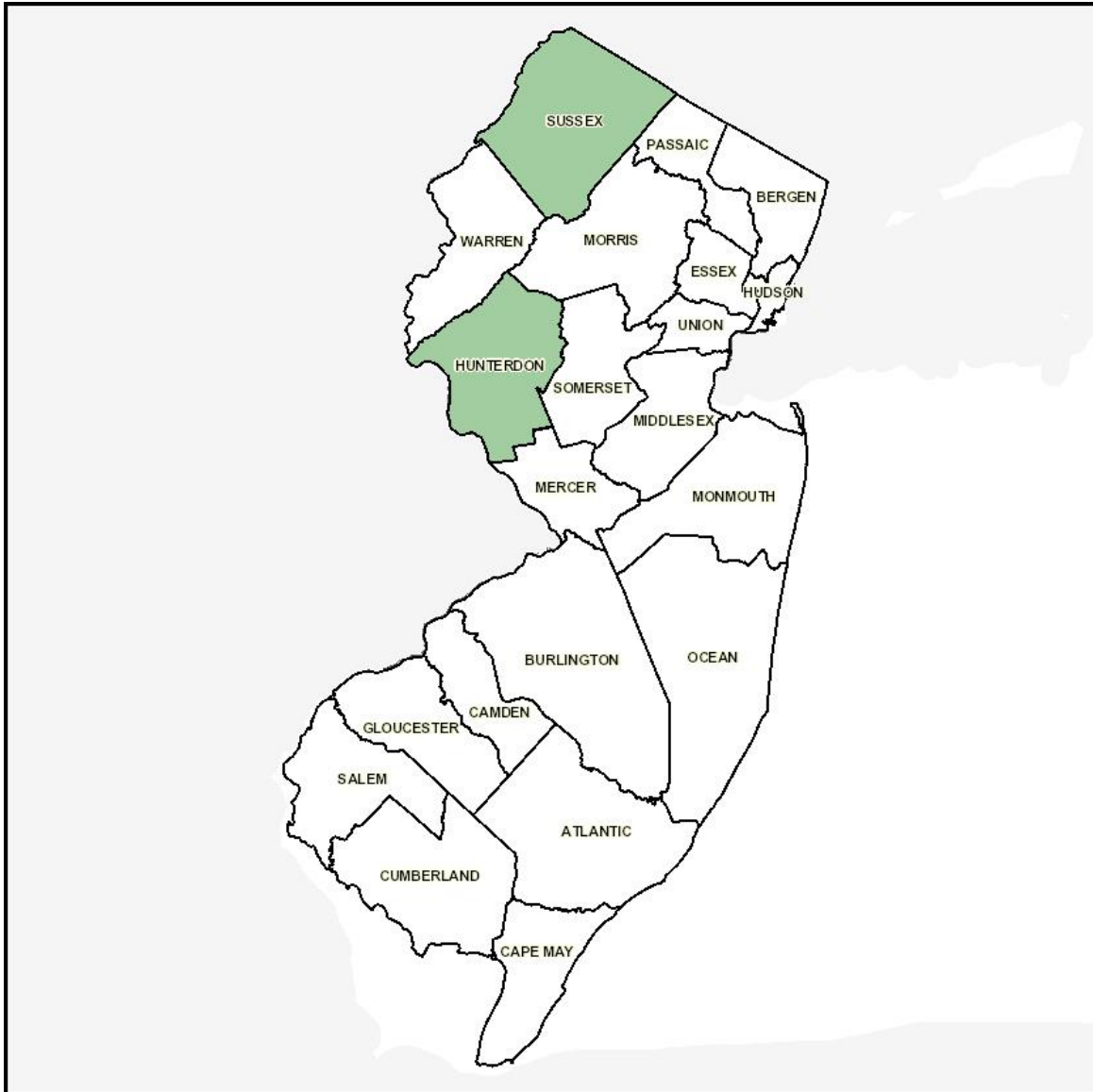


Figure 2. County records of *C. planispicata* in New Jersey (source data from NJNHP 2024).

### **Conservation Status**

*Carex planispicata* is apparently secure at a global scale. The G4 rank means the species is at fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, although there is some cause for concern as a result of recent local declines, threats, or other factors (NatureServe 2025). The map below (Figure 3) illustrates the conservation status of *C. planispicata* throughout its range. The sedge is critically imperiled (very high risk of extinction) in two states, imperiled (high risk of extinction) in three states, and vulnerable (moderate risk of extinction) in three states. It is secure, apparently secure, or unranked in other states where it occurs.

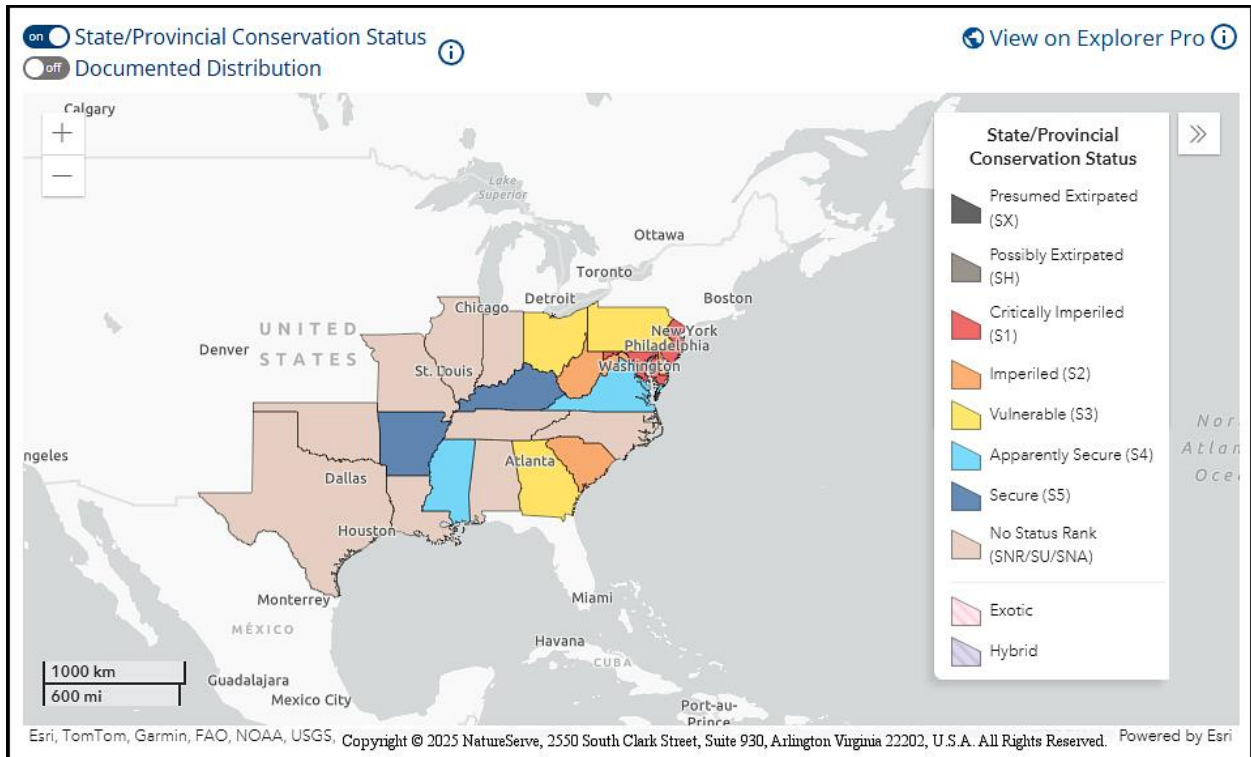


Figure 3. Conservation status of *C. planispicata* in North America (NatureServe 2025).

New Jersey is one of the states where *Carex planispicata* is critically imperiled (NHNHP 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. *C. planispicata* is also listed as an endangered species (E) in New Jersey, meaning that without intervention it has a high likelihood of extinction in the state. Although the presence of endangered flora may restrict development in certain communities, being listed does not currently provide broad statewide protection for the plants. Additional regional status codes assigned to Narrow-leaf Sedge signify that the species is eligible for protection under the jurisdictions of the Highlands Preservation Area (HL) and the New Jersey Pinelands (LP) (NHNHP 2010). Five occurrences are tracked by the Natural Heritage Program but the current status of several populations is uncertain (NHNHP 2024).

### **Threats**

Nearly every known population of *Carex planispicata* in New Jersey appears to be threatened by the rapid proliferation of invasive flora. Species of potential concern that were noted at various sites include *Alliaria petiolata*, *Berberis thunbergii*, *Elaeagnus umbellata*, *Microstegium vimineum*, *Rosa multiflora*, and *Rubus phoenicolasius*. One occurrence faces additional threats from a proposed rockfall mitigation project (NHNHP 2024). No reports of threats to *C. planispicata* populations were found from other parts of its range, although some upland habitats could be eliminated by development.

## **Climate Change Vulnerability**

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Carex planispicata* populations 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 *C. planispicata* was assessed as Less Vulnerable, meaning that climate change is not expected to have a notable detrimental impact on its extent in New Jersey by 2050.

Shifting climactic conditions in New Jersey are resulting in higher temperatures, more frequent and intense precipitation events, and increasing periods of drought (Hill et al. 2020). Because *Carex planispicata* was only recently identified as a distinct entity, information about the ecological requirements of the sedge is limited. Narrow-leaf Sedge is a southern species that reaches the northern edge of its range in New Jersey so warmer conditions will probably not be limiting, although the potential impacts of extended drought are not known. Unusually heavy rainfall events during recent years have occasionally resulted in mudslides on sloping hillsides similar to some of the sites that are presently supporting *C. planispicata* populations (pers. obs.). Occurrences in the state are already at risk due to competition with aggressively invasive plants (NJNHP 2024), which are likely to become an even greater threat as the climate continues to warm. The northeastern and mid-Atlantic regions are predicted to become hotspots for the introduction of new species (Bellard et al. 2013, Salva and Bradley 2023), and a number of the exotic species which have already gained a foothold in the northeast are expected to become more abundant (Dukes et al. 2009, Coville et al. 2021, O'Uhuru 2022).

## **Management Summary and Recommendations**

Conservation plans for extant *Carex planispicata* populations in New Jersey should be focused on controlling the proliferation of invasive plant species, which were identified as a concern for all of the occurrences that have been observed during the past decade. One occurrence has not been monitored since 1993 so a site visit is recommended to assess population status and current habitat conditions.

There are a number of areas where more information would be beneficial to land managers in districts where *Carex planispicata* is imperiled. Suggested research topics include self-compatibility, seed longevity, germination requirements, mycorrhizal associations, range of climactic tolerances, and responses to fire.

## **Synonyms**

The accepted botanical name of the species is *Carex planispicata* Naczi. Orthographic variants, synonyms, and common names are listed below (ITIS 2025, POWO 2025, USDA NRCS 2025).

## Botanical Synonyms

*Carex amphibola* var. *rigida* (L. H. Bailey) Fernald  
*Carex grisea* var. *rigida* L. H. Bailey

## Common Names

Narrow-leaf Sedge  
Flat-spiked Sedge

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