

Solidago rigida var. *rigida* L.

Stiff flat-topped goldenrod

Asteraceae



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Solidago rigida var. *rigida* Rare Plant Profile

New Jersey Department of Environmental Protection
Division of Parks and Forestry
New Jersey Forest Service
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Life History

Solidago rigida var. *rigida*, known by the common names stiff goldenrod or stiff flat-topped goldenrod, is a showy perennial in the aster family, Asteraceae. *S. rigida* is divided into 3 varieties or subspecies (depending on the source). All *S. rigida* populations found in the northeast belong to the var. *rigida* designation, but var. *rigida* and *humilis* populations begin to overlap in the Midwest where the species is much more common (Brown, 2002). *S. rigida*, in general, is uncommon in the Eastern United States (Kartesz, 2015). Furthermore, *S. rigida* appears most often in scientific literature as a member of species lists and is rarely differentiated down to the level of variety. As such, it is difficult to draw conclusions concerning the biology of *S. rigida* var. *rigida* (Brown, 2002). *S. rigida* var. *rigida* (referred to as *S. rigida* forthwith) is found in dry, open habitats such as post agricultural fields, rocky hillsides, limestone ledges, roadsides, and sandy prairies, but has been known to occupy wet sites such as seepage fens (Gleason and Cronquist, 1991; Newcomb, 1977; Brown, 2002; New Jersey Natural Heritage Program, 2019). *S. rigida* grows .25-1.5m tall, with densely pubescent leaves and stems. Large basal leaves are 6-25 x 2-10cm in size, toothed to entire, broadly lanceolate to oblong/ovate, and rounded to an acute tip, with a petiole often longer than the leaf itself. Cauline leaves are nearly sessile and much longer than they are wide, but still significantly smaller than the basal leaves. The dense inflorescence is bright yellow, corymbiform, and 5-25cm wide with flower heads 5-10mm wide, subtended by a glabrous involucre 5-9mm wide with firm, striated bracts. Flower heads consist of rays and disk flowers. Rays number 7-14 and are 3-5mm wide while each head contains 17-35 disk-flowers (Gleason and Cronquist, 1991). *S. rigida* var. *rigida* can be differentiated from varieties *humilis* and *glabrata* by its relatively robust height, glabrate to strigillose inner phylaries, and coarsely hispid leaves and stem; varieties *humilis* and *glabrata* only attain heights of 90 and 70cm, respectively, and possess either glabrous (*glabrata*) or conspicuously strigose (*humilis*) stems and leaves (Flora of North America Vol. 20, 2019). First year plants produce a basal rosette with second and third year plants producing flowering stalks (Brown, 2002). While there are many species of *Solidago* found in New Jersey, *S. rigida* is especially showy compared to related species, with a uniquely corymbiform inflorescence and conspicuously large flower heads. Additionally, *S. rigida* produces far fewer flowers per stem than other species of *Solidago* (Brown, 2002). *S. rigida* flowers late summer from mid-August to early October (New York Natural Heritage Program, 2019). Finally, *S. rigida* var. *rigida* is the only variety of *S. rigida* that naturally occurs in New Jersey. It is easiest to identify when in flower.

Pollinator Dynamics

While there are no scientific studies focused specifically on the pollinator dynamics of *S. rigida*, much of the pollinator information available is centered around morphological based inferences and field observations from the prairies of the American Midwest. Chief among the

morphological based inferences is that *S. rigida* is an obligate outcrosser; there is no literature to confirm this claim, but the myriad of visiting pollinator species lends support to this idea (Brown, 2002). A number of reports and observations indicate that *S. rigida* is visited and pollinated by a multitude of insects, from a number of bee species (Hymenoptera) to butterflies (Lepidoptera) and lacewings (Neuroptera) (Brown, 2002; Havercamp & Whitney 1983).

Seed Dispersal

Similar to pollinator dynamics, information on seed dispersal comes from inferences and field observations, largely from plants found in prairie habitats. *S. rigida* produces a large number of small seeds (Brown, 2002). Relative to other field and prairie species, *S. rigida* is average to slightly above average in seed weight, balancing the ability to penetrate soil with a capacity for wind borne dispersal (Platt, 1975; Havercamp & Whitney, 1983; Brown, 2002). Reinforcing the idea of an intermediate dispersal strategy, *S. rigida* possesses a relatively small pappus (7-10mm), capable of limited wind-borne dispersal (Platt, 1975).

Habitat

The habitat of *S. rigida* is variable throughout its range, but is largely found in dry, open sites. *S. rigida* is found in mesic to xeric soils in open habitats and is a common component of mixed prairies in the American Midwest (Brown, 2002). In the northeast, *S. rigida* grows among old fields, rocky slopes, limestone ledges, and dry shores (Gleason and Cronquist, 1991; Newcomb, 1977; Brown, 2002; New Jersey Natural Heritage Program, 2019). Northeastern occurrences of *S. rigida* indicate a proclivity for calcareous soil, commonly being found on sandy and/or limestone substrates (Brown, 2002; New Jersey Natural Heritage Program, 2019).

In New Jersey, there are 14 known occurrences, 12 of which are assumed extirpated or known only by historical records. New Jersey habitat includes exposed limestone ledges along railroad tracks and quarries, rocky wooded hillsides, old fields, and a single occurrence found in an open limestone seepage fen, the only known wetland occurrence of *S. rigida* in the northeast. Associated species include *Helianthus divaricatus*, *Aster phlogiformis*, *Aristolochia serpentaria*, *Eupatorium sessilifolium*, *Equisetum hyemale*, *Ceanothus americanus*, *Juniperus virginiana*, *Quercus rubra*, *Penstemon digitalis*, *Zanthoxylum americanum*, and *Ostrya virginiana* (New Jersey Natural Heritage Program, 2019, New York Natural Heritage Program, 2019).

Wetland Indicator Status

UPL

S. rigida var. *rigida* is classified as an obligate upland species, indicating that it almost never occurs in wetlands (USDA, 2019).

USDA Plants Code

SORIR2

“Each symbol is composed of the first two letters of the genus+first two letters of the species+first letter of the terminal infraspecific name+tiebreaking number (if needed)” (USDA, 2019).

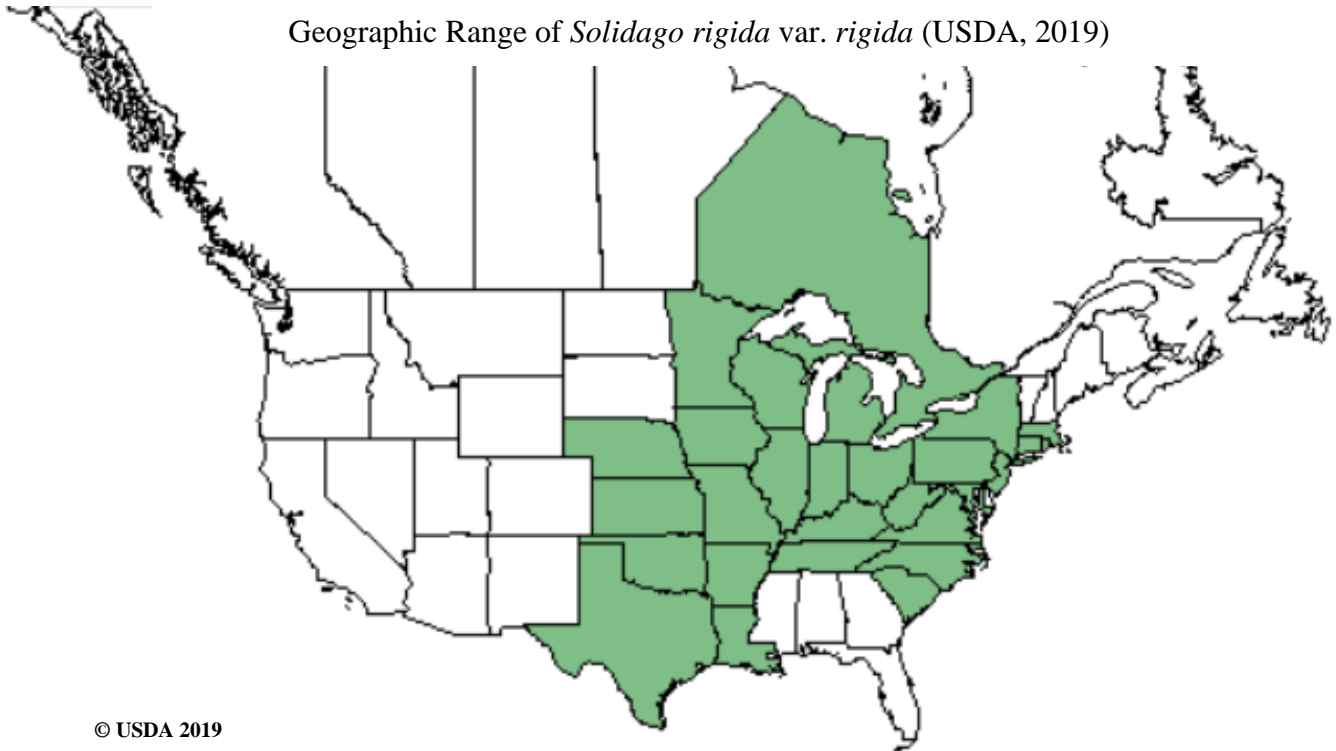
<https://plants.usda.gov/core/profile?symbol=OLRIR>

Coefficient of Conservatism (Walz et al. 2018)

CoC=9; Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance.

Distribution and Range

Geographic Range of *Solidago rigida* var. *rigida* (USDA, 2019)



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S. rigida var. *rigida* is found in Ontario, New York, western Massachusetts, and Connecticut south to Georgia and west to North Dakota (NatureServe, 2019). While it is relatively rare in the eastern portion of its range, *S. rigida* var. *rigida* is fairly common in states west of the Appalachian Mountains (Kartesz, 2015). Conservation ranking for each state/province within the range is as follows: Arkansas (SNR), Colorado (SNR), Connecticut (S1), Delaware (SU), District of Columbia (SX), Georgia (S3), Illinois (SNR), Iowa (S4), Kansas (SNR), Kentucky (S4), Maryland (S1), Massachusetts (SH), Michigan (SNR), Missouri (SNR), Nebraska (SNR), New Jersey (S1), New York (S2), North Carolina (S2), Ohio (SNR), Oklahoma (SNR), Ontario (S3), Pennsylvania (S1), Rhode Island (SNR), South Carolina (S1), South Dakota (SNR), Tennessee (SNR), Texas (SNR), Virginia (S2), West Virginia (S1), and Wisconsin (SNR) (NatureServe, 2019).

Conservation Status

Status for New Jersey:

Solidago rigida var. *rigida* (S1) (HL, LP)

S1 indicates critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered. HL indicates protection by the Highlands Water Protection and Planning Act within the jurisdiction of the Highlands Preservation Area. LP Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction (New Jersey Natural Heritage Program, 2019).

Threats

Threats to *S. rigida* in New Jersey include deer browse, forest succession, ORV activities, invasive plant species, and human land use and development. Three of four NJ occurrences have seen steep declines in the last decade as a direct result of ORV activity, human development, and invasive species succession. Woody invasives such as *Ramnus cathartica* and *Lonicera mackii* should be dealt with immediately to prevent the further decline and eventual loss of these occurrences. (New Jersey Natural Heritage Program, 2019).

Management Summary and Recommendations

S. rigida thrives in sunny, open habitat. Occurrences experiencing woody succession should be maintained as open early successional habitat. There is also some evidence in Midwestern prairie populations that *S. rigida* can derive significant benefit from controlled burning, increasing plants per 100 square feet more than tenfold (Curtis & Partch, 1948; Brown, 2002). It is unclear whether or not controlled burns would be effective at maintaining occurrences in NJ.

Synonyms

- *Oligoneuron grandiflorum* (Raf.) Small.
- *Solidago grandiflora* Raf.
- *Solidago rigida* L.
- *Solidago rigida* L. var. *rigida*

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