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Status of *Solidago erecta* (Asteraceae) in New York[1]

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LAMONT, E. E. (Local Flora Committee, Torrey Botanical Society, The New York Botanical Garden, Bronx, NY 10458). Status of *Solidago erecta* (Asteraceae) in New York. J. Torrey Bot. Soc. 135: 000–000. 2008.—*Solidago erecta* has long been considered a member of the flora of New York, but recent studies have revealed that the six known voucher collections of *S. erecta* from New York had been misidentified and have been reassigned to *S. speciosa* or *S. puberula*. The earliest published reports of *S. erecta* from New York were partially based on the misapplication of scientific names and a misunderstanding of the taxonomy of the *S. speciosa*/*S. erecta* complex. *Solidago erecta* should be excluded from the flora of New York because it has not been documented from the state with voucher specimens.

Key words: Asteraceae, goldenrod, New York flora, *Solidago erecta*.

The northern range limit of *Solidago erecta* Banks ex Pursh (slender goldenrod) has been reported to extend into southeasten New York and southern New England. The first report (Peck 1899) of *S. erecta* from north of New Jersey was based on a collection from Long Island, New York [Suffolk Co., sandy soil, Baiting Hollow Station, Sept 1898, *Peck s.n.* (NYS)]. Peck's 1898 collection apparently was the source for Jelliffe's (1899) inclusion of *S. erecta* in *The Flora of Long Island*. During the early 1900s, New York was considered to be the northern limit of *S. erecta* (Robinson and Fernald 1908, Britton and Brown 1913, Taylor 1915, House 1924) but in 1950 the range was extended into southern New England (Fernald 1950). From 1950 to present, most regional and local floras have listed New York and/or southern New England as the northern range limit of *S. erecta* (Fernald 1950, Cronquist 1952, Gleason and Cronquist 1963, 1991, Dowhan 1979, Mitchell 1986, Seymour 1989, Young 1992, Magee and Ahles 1999, Semple and Cook 2006).

In the early 1990s, while preparing *Guide to the Goldenrods of Long Island, New York* (Lamont 1992), I visited major herbaria in the Northeast and collected distribution data on 28 taxa of goldenrods including *Solidago erecta*. During the course of those investigations I located only six voucher specimens from New York that had been originally identified as *S. erecta*. Upon critical examination I reassigned all six specimens to either *S. speciosa* Nutt. or *S. puberula* Nutt.

It became apparent to me that *Solidago erecta* should possibly be excluded from the flora of New York. This possibility was discussed with state botanist Richard Mitchell who was also independently considering the possibility. Conversations with Arthur Cronquist revealed that he had previously arrived at the same conclusion because he had never seen a voucher specimen of *S. erecta* from New York. Cronquist considered New Jersey to be the northern range limit of *S. erecta* with disjunct populations in coastal Massachusetts (Cronquist 1952, 1980, Gleason and Cronquist 1963, 1991).

Consequently, Mitchell and Tucker (1997) excluded *Solidago erecta* from the flora of New York and noted that all New York specimens of *S. erecta* examined by them had been reassigned to *S. puberula*. Young (1997) also excluded *S. erecta* from the *New York Rare Plant Status List*. Additionally, Sorrie and Somers (1999) excluded *S. erecta* from the flora of Massachusetts and reassigned historical collections to *S. bicolor* L. and *S. puberula*.

Despite the exclusion of *Solidago erecta* from the flora of New York by Mitchell and Tucker (1997), Cronquist (1952, 1980), and Gleason and Cronquist (1963, 1991), the species continues to be reported from the state (Magee and Ahles 1999, Weldy and Werier 2005, Semple and Cook 2006, Weakley 2008, USDA Plants Database 2008). The purpose of

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[1] This report is the sixth in a continuing series of floristic studies produced by the Local Flora Committee of the Torrey Botanical Society. For historical and background information contained in earlier reports, see Lamont and Young (2006).

[2] Appreciation is expressed to Charles Sheviak for arranging loans and providing data from the plant specimen records on file at the New York State Museum in Albany.

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this paper is to clarify and reinforce with specific documentation the past and present status of *S. erecta* in New York.

Taxonomic History. Pursh (1813) first described *Solidago erecta* as a distinct species and ascribed the name to Joseph Banks. Within less than 25 years, the specific epithet would be applied to three other species of *Solidago* by three different botanists: 1) *Solidago erecta* Nutt., Gen. N. Amer. Pl. 2: 161. 1818. [= *S. petiolaris* Aiton], 2) *Solidago erecta* Elliott, Sketch Bot. S. Carolina, ii. 385. 1823. [= *S. speciosa* Nuttall], and 3) *Solidago erecta* de Condolle, Prodr. 5: 340. 1836. [= *S. bicolor* L.]. These later homonyms caused confusion in botanical literature especially during the mid-1800s (Wood 1855).

Morphological similarities between *Solidago erecta* and *S. speciosa* coupled with a wide range of morphological variation within *S. speciosa* have contributed to additional taxonomic and nomenclatural confusion within the *S. speciosa*/*S. erecta* complex. By the early 1900s, synantherologists began to sort out the confusing array of binomials that are currently applied to the *S. speciosa*/*S. erecta* complex, including *S. chandonnettii* E. S. Steele, *S. conferta* P. Mill., *S. harperi* Mackenzie ex Small, *S. jejunifolia* E. S. Steele, *S. pallida* (Porter) Rydb., *S. porteri* Small, *S. rigidiuscula* Torr. & A. Gray, and *S. venulosa* Greene.

In 1892, MacMillan recognized the close affinities between *Solidago erecta* and *S. speciosa* by proposing the new combination *S. speciosa* var. *erecta* (Pursh) MacM. The inclusion of *S. erecta* as a variety in *S. speciosa* is currently controversial but is followed by Integrated Taxonomic Information System (ITIS 2008).

The taxonomic status of *Solidago speciosa* var. *angustata* Torr. & A. Gray played a significant role in the early reports of *S. erecta* from New York. The goldenrod that Charles Peck collected from Long Island in 1898 was initially identified by him as *S. s.* var. *angustata*, according to the original label on the voucher specimen at NYS. However, when Peck (1899) published his *Report of the State Botanist* for 1898, he considered *S. s.* var. *angustata* to be a synonym of *S. erecta*. Thus, in Section D of his report under the subtitle "Species Not Before Reported", Peck added *S. erecta* Pursh to the flora of New York and noted: "This goldenrod has been reported under the name *Solidago speciosa* var. *angustata* T. & G., but it is now classed as a distinct species."

Recognition of *Solidago speciosa* var. *angustata* as a synonym of *S. erecta* was short lived. From the early to mid-1900s, var. *angustata* was often recognized as a valid, narrow leaved variety of *S. speciosa* distinct from *S. erecta*, primarily occurring in mid-western prairies from "Ohio to South Dakota, and southward" (Robinson and Fernald 1908, Fernald 1950). Semple and Ringius (1992) continued to recognize *S. s.* var. *angustata* as valid, but Kartesz (1994) listed it as a synonym of *S. s.* var. *rigidiuscula* Torr. & A. Gray. Semple and Cook (2006) concluded that *S. s.* var. *angustata* should be treated as a synonym of *S. s.* var. *speciosa* and noted, "Narrower-leaved plants [of *S. s.* var. *speciosa*] have been treated as var. *angustata*; the type material comes from eastern states, but the name has been misapplied to plants of var. *rigidiuscula* (with persistent narrow basal leaves) from the prairies and prairielike habitats along the western edge of the eastern deciduous forest in the United States."

The most current taxonomic evidence reveals that *Solidago erecta* and *S. speciosa* var. *angustata* are distinct taxa. I studied Peck's 1898 collection of "*S. erecta*" (= *S. s.* var. *angustata sensu* Peck) from Long Island and reassigned it to *S. s.* var. *speciosa*. I agree with Semple and Cook (2006) and Cronquist (1980) that *S. s.* var. *angustata* should be listed as a synonym of *S. s.* var. *speciosa*. Even if one were to include *S. erecta* within a broadly defined *S. speciosa* (ITIS 2008), Peck's Long Island goldenrod collection would still be determined as *S. s.* var. *speciosa*, not *S. s.* var. *erecta*.

Specimens Examined. During the course of this study I examined and annotated hundreds of *Solidago* collections at major New York herbaria, including BKL, CU, NY, NYS, and OBPF, and also at HUH (abbreviations follow Holmgren et al. 1990). I located only six voucher specimens collected from New York that had been originally identified as or later reassigned to *S. erecta*: 1) Nassau Co., Sea Cliff, 5 Sep 1938, *Holtzoff s.n.* (BKL); 2) Putnam Co., dry field, Carmel, 6 Sep 1935, *Gunnison s.n.* (St. Lawrence University Herbarium, Canton, NY); 3) Suffolk Co., sandy soil, Baiting Hollow Station, Sept 1898, *Peck*

s.n. (NYS); 4) Suffolk Co., thickets, East Hampton, 17 Oct 1919, *Taylor s.n.* (BKL); 5) Suffolk Co., dry field, Montauk, 5 Aug 1946, *Latham s.n.* (NYS); 6) Suffolk Co., dry hills, Montauk, 28 Sep 1954, *Latham 32608* (NYS). The five Long Island collections from Nassau and Suffolk counties were all reassigned by me to *S. speciosa* var. *speciosa* and the collection from Putnam County was reassigned to *S. puberula*.

The two collections from Montauk deposited at NYS were originally identified by Latham as *Solidago erecta* but were later filed in a *S. puberula* folder by Mitchell (pers. comm.); in 1990, I reassigned both collections to *S. speciosa* var. *speciosa*. Likewise, the 1898 Peck collection (two sheets) at NYS was still filed in a *S. speciosa* folder under the name *S. s.* var. *angustata* when I examined it in 1990; Mitchell (pers. comm.) had not seen this collection during his investigations because the collection had not been annotated as *S. erecta* and was mixed in and easily confused with dozens of other *S. speciosa* collections. Thus, Mitchell and Tucker (1997) considered "*S. erecta* of NY reports, not Pursh" to be based on misidentifications of *S. puberula* collections.

Unvouchered Reports. Garille (1976) reported *Solidago erecta* from Sands Point Park and Preserve, Nassau County, but no voucher specimen has been found (fide Lindberg 2007) in the small herbarium maintained by Nassau County Museums. Garille's (1976) plant list does not include *S. speciosa*, a relatively common species in the vicinity of Sands Point (Lamont, pers. obs.); therefore, it is probable that the report of *S. erecta* from Sands Point is based on a misidentification of *S. speciosa*.

New York Flora Association (1990) reported *Solidago erecta* from Ulster County, based on "vouchered plant specimen records now on file at the New York State Museum in Albany." Although the report was supposedly based on a post-1980 collection, no voucher from Ulster County could be found at NYS. *Solidago erecta* was not included in *The Flora of Ulster County, New York* by Domville and Dunbar (1970). It has been suggested (Young, pers. comm.) that this report may be the result of a data entry mistake.

Barbour (1993) reported *S. erecta* from two localities on Fishkill Ridge in Dutchess County. In a letter from Kiviat (1995), the report was corrected with the following statement: "This letter is to inform you of an error in Hudsonia's report…[concerning] the presence of erect goldenrod (*Solidago erecta*) at two locations, "Middle Summit" and Bald Hill. In both cases, these were misidentifications of downy goldenrod (*Solidago puberula*), a common species in the Hudson Highlands. Barbour found no erect goldenrod on Fishkill Ridge."

Magee and Ahles (1999) reported *Solidago speciosa* var. *erecta* from southern New England and/or adjacent New York, but provided no specific information on distribution or primary sources for the report. It is assumed that this report was based on misinformation from the historical literature.

Weldy and Werier (2005) reported *Solidago erecta* from Ulster County with the following clarification: "The records in the flora database are largely based on the original atlas (NYFA 1990)". As discussed above, no voucher for *S. erecta* from Ulster County can be located and the original New York Flora Association (1990) report may be based on a data entry mistake.

Semple and Cook (2006) reported *S. erecta* from New York in the Asteraceae treatment in *Flora of North America*. In correspondence dated 17 July 2006, I asked Semple if the report was based on voucher specimens that he had examined. He replied, "I do not claim that the treatment of *Solidago* in FNA is perfect, so it is possible that this may be one of those "errors". The problem lies with the inclusion of *S. erecta* (always diploid) as a variety in *S. speciosa* (diploid, tetraploid, hexaploid). The two can be very similar, but var. *speciosa* is generally much more robust than *S. erecta*. The *S. speciosa*/*S. erecta*/*S. sciaphila* complex needs a more detailed study than I could do for FNA." Since no voucher specimens were cited it is assumed that this report was based on misinformation from the historical literature.

Weakley (2008) listed New York and Connecticut as the northern range limit of *Solidago erecta*. The primary source for the New York report is unknown, but might be based on misinformation from the historical literature.

USDA Plants Database (2008) also reported *Solidago erecta* from Ulster County. This

unvouchered report is probably based on earlier unvouchered reports by New York Flora Association (1990) and Weldy and Werier (2005) [see above discussions].

Summary and Conclusion. The earliest published reports of *Solidago erecta* from New York were partially based on the misapplication of scientific names and a misunderstanding of the confusing taxonomy of the *S. speciosa*/*S. erecta* complex. Only six known voucher collections from New York were originally identified as *S. erecta*, and upon critical examination all six have been reassigned to *S. speciosa* var. *speciosa* or *S. puburula*.

Solidago erecta should be excluded from the flora of New York because it has not been documented from the state with voucher specimens. Numerous post-1950 published reports of *S. erecta* from New York have been based on misinformation from the historical literature.

The potential for a future occurrence of *S. erecta* in New York is possible and should be anticipated. All plants can and do migrate, although with various speeds and to various distances. During the past few decades field botanists in eastern United States have observed the northern migration of numerous southern plant species; because suitable habitat exists in southeastern New York for *S. erecta* to colonize it is possible that the species will eventually become an established member of the flora of New York.

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