

***SOLIDAGO SPELLENBERGII* (ASTERACEAE: ASTEREA),  
A NEW SPECIES OF GOLDENROD FROM MEXICO**

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**ABSTRACT**

A new species of goldenrod, *Solidago spellenbergii* Semple, is described from a collection from Chihuahua, Mexico. The species was originally identified as *S. wrightii*, but the specimen does not fit well into that species. The holotype was included in a multivariate analysis of *Solidago* subsect. *Thrysiflorae* and was placed a posteriori into a position between *S. petiolaris*, *S. orientalis*, and *S. buckleyi* with low probabilities to these species and with even less probabilities into *S. capulinensis* and *S. wrightii*. The species is distinguished from *S. wrightii*, the likely closest relative, on the basis of leaf and ovary/fruit traits. The species is named in honor of one of its collectors, Richard W. Spellenberg.

*Solidago* subsect. *Thrysiflorae* includes *S. buckleyi* Torr. & A. Gray, *S. capulinensis* Cockerell & Andrews, *S. correllii* Semple, *S. orientalis* (Nesom) Nesom, *S. petiolaris* Ait., and *S. wrightii* A. Gray (Nesom 1989, 1990, 2008; Semple & Cook 2006; Nesom & Lowrey 2011; Semple 2017; Semple 2017 frequently updated). Semple et al. (2017) included a specimen *Spellenberg & Jewell* 9266 (NMC) from Chihuahua, Mexico, in a multivariate study of subsect. *Thrysiflorae* and this was placed a posteriori into a position between *S. petiolaris* (51% probability to this species in the first analysis and 64% in the second analysis) and *S. orientalis* (42% probability in the first analysis) and *S. capulinensis* (34% in the second analysis) and with low probabilities to *S. wrightii* (0% in the first analysis and 1% in the second analysis). Early in the multivariate study in 2007, the specimen had been set aside as a possible new species and the results of the multivariate study supported this conclusion.

**SOLIDAGO SPELLENBERGII** Semple, **sp. nov.** **TYPE: MEXICO. Chihuahua.** Mpio. Ocampo, Parque Nacional de Cascada Basaseachic, along trail down a SW-facing slope to base of falls, moderately open, with *Quercus*, *Pinus*, ca. 1800 m, 11 Sep 1987, *R. Spellenberg & D. Jewell* 9266 (holotype: NMC; isotype: MEXU, not seen).

Similar to *Solidago petiolaris* but the lower mid stem leaves narrower, larger, and with a longer petiole than in that species and the inflorescence branching generally more open and long-branched; ovary/immature cypselae body very sparsely strigose. Similar to *Solidago wrightii* but stem leaves narrower, larger, and more membranous and ovary/immature cypselae body much less hairy.

**Plants** 96 cm; caudices branched, thick, and woody. **Stems** 1–3, simple, sparsely short villose-puberulent proximally to moderately densely so in array. **Leaves:** proximal dehisced by flowering, cauline 90–110 × 14–17 mm, petiolate 4–10 mm, well differentiated, blades narrowly oblanceolate, sparsely puberulent on adaxial faces more so on veins of abaxial faces, margins entire proximally to 2–5 teeth distally, ciliate, reduced distally, entire; much reduced arrays. **Heads** 60, not secund, in open thyriform-paniculiform arrays, 20 × 16 cm, proximal branches much elongated 12–15 cm, not secund, diverging to ascending. **Peduncles** 10–18 mm, densely short villous-canescens, sparsely stipitate-glandular; bracts small, few, grading into phyllaries. **Involucre** campanulate, 6–7 mm. **Phyllaries** in 2–3 series, outer ca ½ the length of the inner, linear lanceolate, long attenuate, sparsely strigose, especially distally, sparsely to moderate minutely stipitate-glandular, +/- viscid.

**Ray florets** 6–7; laminae ca. 4–4.5 × 0.7–1.1 mm, yellow. **Disc florets** 10–15; corollas ca 3.2 mm, lobes ca. 1 mm; ovary 1.2–1.5 mm at anthesis. **Cypselae** (immature) somewhat compressed obconic, 2–2.5 mm, very sparsely short-strigose; **pappi** ca. 4 mm at anthesis; mature cypselae not seen. **Chromosome number** unknown.

Flowering September. Open oak-pine woods and rocky open slopes, disturbed ground; ca. 1800 m; Parque Nacional de Cascada Basaseachic, Chihuahua, Mexico.

The species is only known from the holotype collection. It is named in honor of the botanist Richard W. Spellenberg, Emeritus Curator of New Mexico State University Herbarium (NMC).

The multivariate study of subsect. *Thrysiflorae* (Semple et al. 2017) included four additional collections from the same general area of Mexico. *Spellenberg & Spellenberg 7926* (NMC) from S of the village of Basaseachic along the trail leading to Cascada was included in the *Solidago wrightii* a priori group and had much broader upper stem leaves than the holotype of *S. spellenbergii* and moderately strigose ovaries/fruit bodies; it was assigned a posteriori to *S. petiolaris* with 47% probability and to *S. wrightii* with 45% probability in the six species analysis and into *S. petiolaris* with 51% and *S. wrightii* with 49% in the four species analysis. *Nesom & Vorobik 5545* (TEX; Fig. 5) from the confluence of Rio Basaseachic and Rio Durazno had broader mid and upper stem leaves and sparsely strigose ovaries/fruit bodies: it was included a posteriori and assigned to *S. petiolaris* with 71% probability and 24% to *S. wrightii* in the first analysis and to *S. petiolaris* with 78% probability and 20% to *S. wrightii* in the second analysis. *Bye 9883* (NMC) from E of Yecora, Sonora, Mexico to the NW of Basaseachic was included in the *S. wrightii* a priori group and placed a posteriori into that group 85% probability and 87% probability in the two analyses; it had broader thicker leaves than the holotype of *S. spellenbergii*. *Van Devender et al. 98-636* (NMC) also from E of Yecora, Sonora was included in the *S. wrightii* a priori group and placed a posteriori into that group with 99% probability and 100% probability in the two analyses; it had small glandular and somewhat hairy leaves on small shoots. All four collections looked like more typical *S. wrightii* and none had leaves like those of the holotype of *S. spellenbergii*. All four collections were annotated as *S. wrightii* by the author. Guy Nesom (pers. comm.) observed that *S. wrightii* is “relatively common” in the Basaseachic area and noted that “other species endemic within the canyon mostly occur at its very bottom.”

While most species in *Solidago* subsect. *Thrysiflorae* occupy ranges that are allopatric or nearly allopatric, *S. spellenbergii* and *S. wrightii* appear to be sympatric in the local Basaseachic area. It is not clear from herbarium sheet habitat data whether or not the two are sympatric at the very local level or occur in slightly different habitats varying in edaphic or moisture conditions. Are the two species separated by ploidy level? Semple et al. (2017) noted that all counts for *S. wrightii* are diploid and that tetraploids are extremely rare in *S. petiolaris*. Is *S. spellenbergii* tetraploid? The lengths of floral parts often show differences correlated with ploidy level in *Solidago*, and thus involucre height, disc corolla length, ovaries/fruit bodies length at ca. anthesis, and pappus bristle lengths might indicate a ploidy difference between *S. spellenbergii* and *S. wrightii*. The values of each of these traits for *S. spellenbergii* fall within the range of variation of *S. wrightii* and thus do not indicate, but do not preclude, a difference in ploidy level.

A key to all taxa in *Solidago* subsect. *Thrysiflorae* including *S. spellenbergii* is included and the end of the multivariate analysis and discussion in Semple et al. (2017)

#### ACKNOWLEDGEMENTS

This work was supported by a Natural Sciences and Engineering Research Council of Canada Operating and Discovery Grants to the JCS. Joan Venn is thanked for her curatorial assistance with loans. The following herbaria are thanked for loaning specimens and giving

permission to dissect heads of selected specimens: LL, NMC, TEX, and WAT in MT (Thiers continuously updated). The following students assisted in recording location data and collecting morphological data on specimens of *Solidago* subsect. *Thyrsiflorae*: Andrew Lam, Yunfei Ma, Urva Naik, Naomi Steenhof, and Lan Tong.

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Figure 1. Holotype of *Solidago spellenbergii* (Spellenberg & Jewell 9266) from Parque Nacional de Cascada Basaseachic, Chihuahua, Mexico.



Figure 2. Details of holotype of *Solidago spellenbergii*: stems. A. Portion of rootstock and lower stems, some 1-2 seasons old. B. Upper stem. C. Stem in lower inflorescence. Scale bar = 1 cm in A; = 1 mm in B and C.

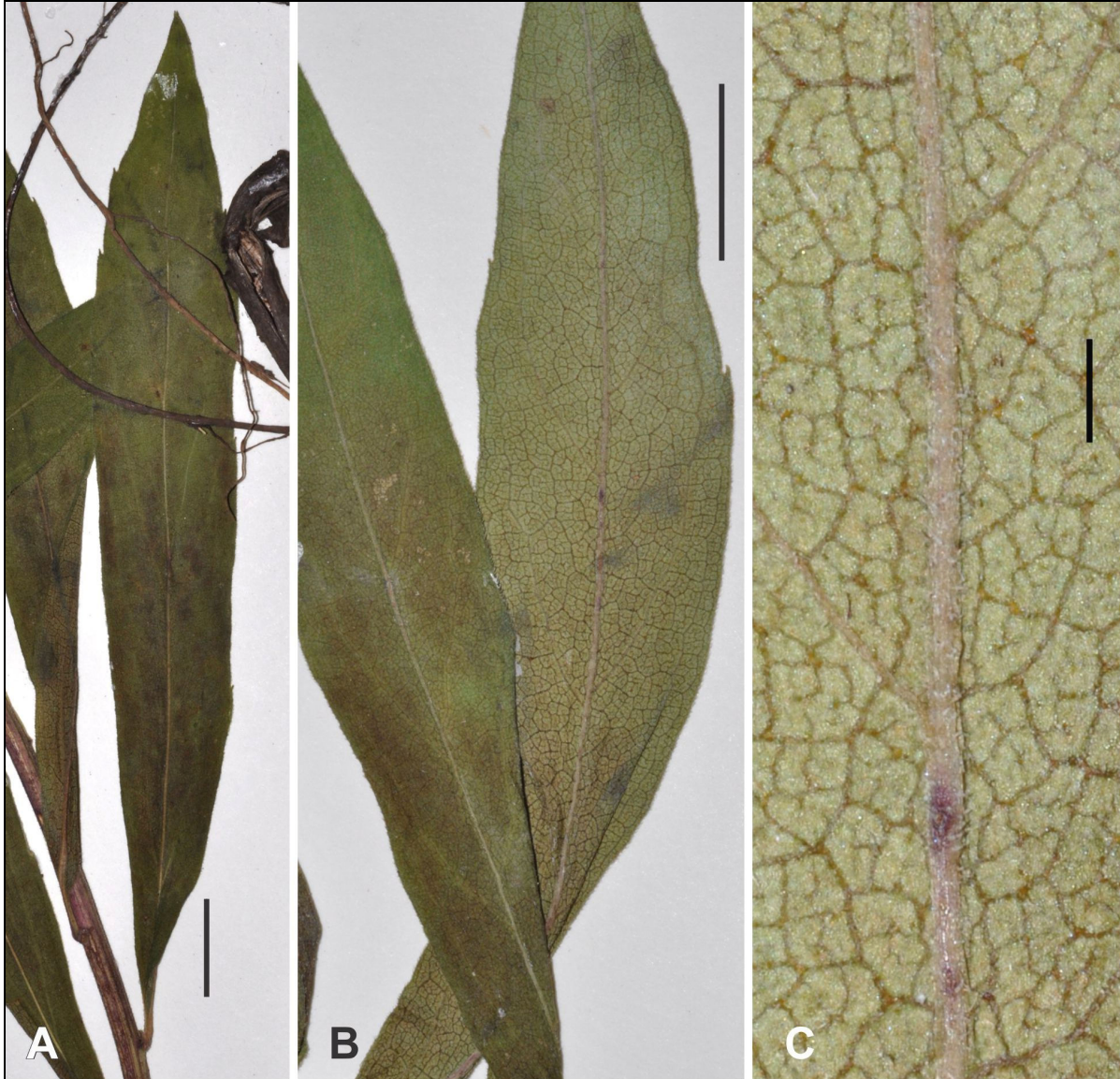


Figure 3. Details of holotype of *Solidago spellenbergii*: leaves. A. Mid stem leaf, adaxial surface. B. Upper stem. C. Mid stem leaf midvein at upper mid portion of leaf. Scale bar = 1 cm in A and B; = 1 mm in C.



Figure 4. Details of holotype of *Solidago spellenbergii*: heads and florets. A. Heads. B. Phyllaries. C. Ray floret. D. Disc florets at and post anthesis. Scale bars = 1 mm.

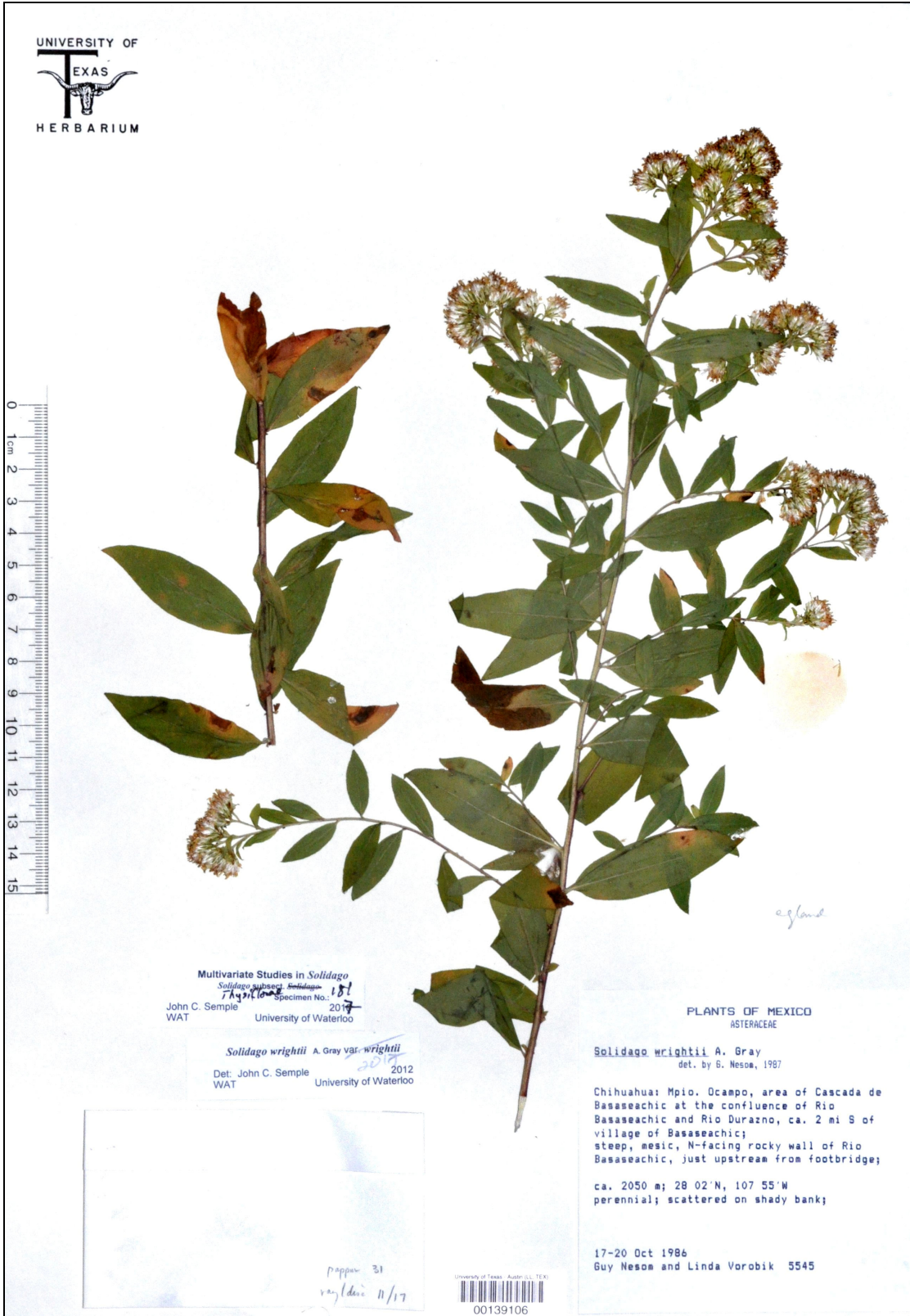


Figure 5. *Solidago wrightii* (Nesom & Vorobik 5545 TEX) from Parque Nacional de Cascada Basaseachic, Chihuahua, Mexico.