The *Solidago* (Goldenrods) of Missouri

The following key is a corrected version of a paper published in the 2000 issue of *Missouriensis* (the journal of the Missouri Native Plant Society). Errors in the original occurred after the editorial process.

Identifying goldenrods to species level, especially in sterile states, is notoriously difficult due to the diversity of the genus and subtle differences among species. This difficulty often serves as a barrier to the accurate and timely collection of field data by public and private conservation agencies throughout the state as well as impedes the interests of the curious observer. While Steyermark's (1963) treatment bases 25 of 29 couplets on vegetative qualities, the remaining four occur early in the key and thus subordinate vegetative characters to floral. The following key attempts to facilitate the identification of all goldenrods growing naturally in Missouri by allowing determinations based on vegetative characteristics observable throughout the growing season.

To use this key, one must be certain the specimen in question is indeed a goldenrod. While goldenrods are quite distinct in vegetative morphology, they can be and often are mistaken for asters in terms of size, leaf shape, and overall stature. While the subtle characters of each genus often transcend verbal description, one can quickly narrow the focus by the following characters;

- if basal and lower stem leaves are cordate or truncate, it is not a goldenrod
- if leaves are triple-nerved, it is not an aster
- if crushed leaves smell like carrots, it is probably a goldenrod; if not, it is probably an aster
- if the stem is branched below the inflorescence, it is probably an aster
- if the stem is unbranched, it is probably a goldenrod (unless the tip is damaged)
- goldenrod foliage tends to be somewhat yellow-green; aster foliage is almost always darker green to bluish-green

Once the specimen is determined to be a goldenrod, the following key will greatly facilitate identification to species. Varieties are not addressed in the present work.

1. Basal rosette present or lowest leaves of the stem larger than the middle and upper stem leaves (thus, leaves get smaller from base of the plant up); note: as the growing season progresses the lower leaves may be dead and shriveled, thus requiring close examination.
  2. Leaves conduplicate (folded along the midrib into two equal halves), long, linear and entire with scabrous margins; obligate to wetlands..... *S. riddellii*
  2. Leaves with flat, non-linear blades that are usually toothed (less often so in *S. speciosa*); various habitats
    3. Upper surface of leaf extremely scabrous; stems angled; plants of swampy meadows, fens, swampy thickets and moist ledges of dripping limestone bluffs..... *S. patula*
    3. Upper surface of leaf glabrous or with pubescence other than extremely scabrous; stems terete; plants of various habitats
      4. Leaves with a single prominent longitudinal nerve (single-nerved)
        5. Leaves glabrous to glabrate on upper and lower surfaces; if glabrate then hairs limited to the veins of the lower leaf surface
          6. Leaves extremely reduced up the stem and becoming bract-like; basal leaves narrowly oblanceolate; primarily restricted to limestone and dolomite glades and rocky prairies of the Ozarks region.....…. *S. gattingeri*
          6. Leaves gradually reduced in size up the stem; basal leaves wider; plants of various habitats

7. Lower leaves entire to remotely toothed……..... *S. speciosa*

7. Lower leaves with conspicuous, regular teeth

8. Leaves dark green; lower stem and basal leaves typically wide and abruptly contracted to a definite petiole (although with decurrent tissue); upper leaf surface darker green than lower surface, which often appears grayish-green..... *S. arguta*

8. Leaves light to olive-green; lower and basal leaves merely tapered to a petiole; leaf surfaces essentially the same color…….....…. *S. juncea*

5. Leaves conspicuously pubescent on upper and/or lower surfaces

9. Pubescence on leaf surfaces hirtellous (short-dense) which gives them an unusual texture ranging from soft-scratchy to velvety

10. Basal leaves lacking decurrent tissue on the petiole; blade oblanceo-elliptic; cauline leaves sessile to clasping; inflorescence corymbiform..... *S. rigida*

10. Basal leaves possessing decurrent tissue on the petiole; blade spatulate to oblanceolate; cauline leaves tapering to the base; inflorescence paniculate…..... *S. nemoralis*

9. Pubescence of leaves (upper and/or lower surfaces) conspicuous and of variable density but not short hirtellous and not exhibiting an unusual texture

11. Entire plant with a uniformly dense pubescence creating a grayish hue; leaf margins variable, but essentially more crenate than serrate..... *S. hispida*

11. Plants much less pubescent; leaf margins variable, but essentially more serrate than crenate

12. All leaves strongly ovate to elliptic-ovate and possessing distinct petioles derived from strongly acuminate leaf bases; leaf pubescence long-hirsute and limited to the underside of leaves; upper leaf surface glabrous and smooth; leaf margins serrate with uniform and jagged-spreading teeth; stem zig-zags from nodes…..…..… *S. flexicaulis*

12. Leaves lanceolate to elliptic and not possessing strongly acuminate leaf bases; leaf pubescence hirsute and usually occurring on both surfaces of leaf blade; upper leaf surface sparsely pubescent and slightly rugose; leaf margins serrate or crenate but not uniformly jagged-spreading; stems straight…….....……...…….. *S. ulmifolia*

4. Leaves with a prominent central nerve accompanied by two less conspicuous longitudinal nerves (triple-nerved)

13. All leaves strongly ovate to elliptic-ovate; larger leaves with strongly acuminate leaf bases.....……...……..… *S. drummondii*

13. All leaves lanceolate to oblanceolate and lacking acuminate leaf bases

14. Leaves possess a "lacquered" sheen and divergent teeth; leaves oblanceolate and long petiolate; heads few; flowers white…..…… *S. ptarmicoides*

14. Not fitting the above criteria

15. Leaves extremely reduced up the stem and becoming bract-like; plants lacking fascicles of leaves in the axils of the upper stem leaves; found only on limestone and dolomite glades and rocky prairies of the Ozarks region….....……..…….…..... *S. gattingeri*

15. Stem leaves maintaining an unexaggerated reduction in size from lower to upper stem and not becoming bract-like; plants often with fascicles of leaves in the axils of the upper stem leaves; found throughout the in prairies, pastures and woods.....…….....… *S. missouriensis*

1. Basal rosettes abscent; leaves of the stem uniform in size or with larger (longer) leaves toward the middle of the stem (thus lowest leaves of the stem are the smallest or same size as the leaves found mid to mid-lower stem). note: shorter leaves of the lower stem may be few in number, dead or shriveled, thus requiring close examination.

16. Leaves conduplicate (folded along the midrib into two equal halves); leaves long linear and entire (margins scabrous)……..……..…… *S. riddellii*

16. Leaves with flat, non-linear blades that are usually toothed; not obligate to wetlands

17. Leaves with a prominent central nerve accompanied by two less conspicuous longitudinal nerves (triple-nerved)

18. Stems glabrous

19. Axes of leaves (esp. upper stem) often with fascicles of smaller leaves; leaves narrowly lanceolate; plants of prairies, open woods, and fields throughout Missouri…….……..…… *S. missouriensis*

19. Axes of leaves lacking fascicles of smaller leaves; leaves typically lance-elliptic to lanceolate; plants typically of moist habitats (i.e. along streams/alluvial soils)…….……..…. *S. gigantea*

18. Stems pubescent

20. Leaves with conspicuously acuminate bases; leaves broadly elliptic and more or less petiolate...…..... *S. drummondii*

20. Leaves with obtuse or acute bases; leaves lanceolate to narrowly elliptic and sessile

21. Upper leaf surfaces with a subtle roughness; lower leaf surface exhibiting a velvety pubescence…….…..…… *S. altissima*

21. Upper leaf surface with a conspicuously rough texture (like sandpaper); lower leaf surface lacking a velvety pubescenc..... *S. radula*

17. Leaves with a single prominent longitudinal nerve (single-nerved)

22. Leaves with minute depressed dots (hold leaf to light); leaves anise-scented (like black licorice) when bruised…….……..…. *S. odora*

22. Leaves lacking minute depressions; leaves not anise-scented when bruised

23. Leaves broadly elliptic to elliptic-ovate and possessing distinct petioles below abruptly acuminate leaf bases

24. Stems densely pubescent; plants of bluffs and rocky outcroppings….....*S. drummondii*

24. Stems glabrous; plants of variable habitats……..... *S. flexicaulis*

23. Leaves lanceolate to elliptic and not possessing abruptly acuminate leaf bases or distinct petioles

25. Leaves distinctly rugose and slightly rounded at the base; lower stem leaves often distinctly scabrous.....…….....…… *S. rugosa*

25. Leaves lightly wrinkled to smooth and tapering to the base; leaves occasionally slightly scabrous to completely glabrous

26. Stems with a glaucus coating and a zig-zag pattern (esp. the upper 1/3 of the stem)…….....…….....…… *S. caesia*

26. Stem lacking a glaucus coating and a zig-zag pattern

27. Leaves rather thick, firm, often lacking marginal serration, and with a slight metallic sheen as though "lacquered"; lower surface of leaves slightly scabrous to glabrous; stems with very short, uniformly bent hairs of variable density; widest leaves 14-20mm wide……..... *S. petiolaris*

27. Leaves not especially thick or firm, usually with some degree of serration and without a "lacquered" sheen to the leaves; leaves hirsute below (at least on the veins); stem glabrous, tomentose or hirsute but

not as above; widest leaves greater than 20mm wide

28. Stems conspicuously tomentose; lowest leaves of stem persistent and considerably shorter and narrower than middle and upper leaves; mid-stem leaves and above are +/- equal in size or only slightly reduce in size toward the top of the stem; upper leaf surface with a relatively smooth texture.....…. *S. buckleyi*

28. Stems glabrous to hirsute but never tomentose; lowest leaves of the stem are often deciduous (thus may have fallen off) and are equal to or larger than the middle and upper leaves of the stem; leaves from the middle of the stem up become noticeably reduced in size; upper leaf surface with a very subtly scabrous (scratchy) texture..... *S. ulmifolia*