MONOGRAPH OF THE NORTH AND CENTRAL AMERICAN SPECIES OF THE GENUS SENECIO—PART II

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INTRODUCTION

The study upon which this monograph is based was begun nearly twenty years ago, at which time the author was an Assistant at the Gray Herbarium of Harvard University. Nearly every collection of any considerable size which came to the Herbarium, particularly from western United States, Mexico, and Central America, contained specimens of Senecio, many of which were either undetermined or referred doubtfully to some obscure or little known species. The identification of such material was often a laborious task, since all species recorded from a given region had to be listed and then specific identity established by a process of elimination. The available publications for such work were De Candolle’s ‘Prodromus,’ Gray’s ‘Synoptical Flora,’ and Hemsley’s splendid contribution to the systematic literature of the botany of Mexico and Central America in the ‘Biologia Centrali-Americana’; but the results obtained were often very unsatisfactory, because of the large number of new species published in scattered papers during the two decades following the appearance of the ‘Synoptical Flora’ and the ‘Biologia.’

It was felt, therefore, that a revision of the genus, in the light of recent and more complete collections, which have accumulated from the numerous botanical explorations in different parts of North America, would be helpful to those concerned with this difficult group of plants and especially in the organization of material in different herbaria. A critical study of Senecio with the view of publishing eventually a

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monograph was suggested to me by Dr. B. L. Robinson, Curator of the Gray Herbarium, who very kindly offered to place at my disposal the entire representation of this genus in the Gray Herbarium, and who, moreover, willingly granted me the exceptional privilege of taking abroad the North American specimens, including all the types, for comparison and study in European herbaria. Accordingly nearly 2,000 mounted specimens were taken to Berlin; and through the courtesy of the authorities of the Royal Botanical Gardens and Museums of Berlin every facility in that institution, which is remarkably rich in Central and South American plants, was accorded me and work on the task was begun under the direction of Professor A. Engler.

It was necessary first of all to acquire a detailed knowledge of the general morphology of the genus Senecio as a whole, and also of the closely allied genera. The results of these investigations are briefly recorded in the first part of this monograph, namely 'Monographie der nord- und central-amerikanischen Arten der Gattung Senecio, I. Teil' which is frequently referred to in the following text. This preliminary work and the rich collections of the Gray and Berlin Herbaria form, therefore, the basis for the present systematic part of the monograph.

After completing my studies in Berlin I went to London, taking the Gray Herbarium specimens with me, and there spent several weeks, particularly in the examination of authentic and type specimens at the Kew Herbarium and in the Linnean Herbarium. The opportunity at Berlin, Kew, and Paris to actually compare side by side and in detail, recent specimens, or series of specimens, with many of the older types, some of which are more or less incomplete, has been of very great advantage, and, in fact, has made it possible to establish beyond doubt the identity of many of our American species.

In addition to those herbaria mentioned it also has been my good fortune to study this group of plants in several American institutions, notably the Herbarium of the Geological Survey of Canada, the United States National Her-
barium, the New York Botanical Garden Herbarium (including the Torrey Herbarium), the Herbarium of the Field Museum of Natural History, the Herbarium of the Philadelphia Academy of Natural Sciences, the Missouri Botanical Garden Herbarium, and a number of private collections. To the directors and curators of all these, as well as the owners of the private herbaria, and correspondents who have facilitated my work, I wish to express personal thanks; but I desire especially to extend most grateful acknowledgments to Dr. Benjamin Lincoln Robinson, Asa Gray Professor of Systematic Botany at Harvard University, and Geheimrath Professor Dr. Adolph Engler, Director of the Royal Botanical Gardens and Museum of Berlin, without whose coöperative interest and extreme liberality in the use of valuable scientific material under their charge, this work would have been impossible. I am also grateful to Mr. W. Botting Hemsley, of the Kew Herbarium, through whose courtesy I secured type material of certain rare Mexican species and a number of excellent drawings, some of which are herein reproduced.

I have cited exsiccatae rather freely, particularly such as occur in American herbaria, but by no means all that have been examined, and I have given even at the expense of much repetition detailed citation of specimens in different herbaria, hoping that this would be helpful in the interpretation of species and to future students of the genus. The few plates which it is possible to include are chosen to illustrate more especially the different sections as here defined.

**SENECIO [TOURN.] LINN.**

Cacalia, Cineraria, and Gynoxis, in part, of authors.

Heads heterogamous and radiate, or discoid. Involucre cylindrical campanulate, occasionally flask-shaped, usually subtended by calyculate bracteoles; bracts of the involucre uniseriate, or by overlapping subbiseriate, variable in number but tending to approach a definite series of numbers, namely 5–8–13–21. Ray-flowers when present disposed in a single row, fertile; rays sometimes more or less reduced. Disk-flowers perfect; corollas slenderly tubular to abruptly ampliated above into a campanulate 5-toothed limb, teeth mostly short. Anthers obtuse or slightly sagittate at the base. Style-branches subterete, recurved-spreadling, truncate, rounded-obtuse, occasionally terminated by a small penicillate tuft of hairs, or (in the subgenus Pseudogynoxis) terminated by a triangular acute or acuminated appendage. Achenes subterete, usually ribbed, glabrous, or more or less hirtellous especially on the ribs. Pappus of numerous usually white setae.—Annual, biennial, or perennial herbs, shrubs, climbers, or even arboreous plants, with alternate or radical, very variable, pinnately or palmately veined, entire or variously divided leaves.

**Synopsis of the Subgenera and Sections**

Subgenus I. Eusenecio Hoffm. Style-branches truncate, rounded-obtuse or occasionally terminated by a penicillate tuft of hairs.

A. Stems erect or ascending, not climbing.
a. Stems not abruptly terminated by a foreshortening of the main axis; oil-tubes not richly developed in the peripheral portion of the stem.
a. Leaves pinnately veined; lateral nerves not numerous or conspicuous.

1. Annual herbs ................................... § 1. Annual
II. Biennial or perennial herbs (rarely annual).

1. Stems herbaceous.

* Heads usually radiate; flowers yellow, except in *S. Greenei* and *S. crocatus*.

† Stem leafy to the inflorescence; leaves lacinately pinnatifid to triternately divided.

0. Native species . . . . . §
00. Introduced species . . . §

†† Stem not uniformly leafy to the inflorescence; leaves pinnate or the lower simple and undivided.

0. Leaves pinnate or pin-natisect, rarely undi-vided . . . . . . . §
00. Lower leaves rotund-ovate, simple and un-divided . . . . . . . §

††† Stem not uniformly leafy to the inflorescence; leaves simple and entire to lyrate-pinnatifid; plants either quite glabrous from the start or more or less permanently tomentose; pubescence never of long jointed hairs.

0. Plants glabrous or early glabrate; leaves upwardly reduced on the stem . . §
00. Plants at first tomen-tose, later glabrate; leaves more uniform throughout a n d mostly pinnately di-vided . . . . . . . §
000. Plants permanently tomentose or more or less glabrate; stem-leaves upward-ly reduced . . . . . §

†††† Stem leafy to the infl orescence (except in § 9); pubescence usually of long jointed hairs.

0. Stem-leaves not am-plexicaul.

5. Leaves not digitat-ely divided . . §
55. Leaves digitately divided . . . . . . §

00. Stem-leaves amplexi-caul.

6. Involucre ecaly-culate . . . . . . . §
65. Involucre calycu-late . . . . . . §

0. Involucre ecaly-culate . . . §
55. Involucre caly cu-late . . . . . §

1. Eremophili
2. Jacobaeae
3. Sanguisorboidei
4. Bolanderiani
5. Aurei
6. Lobati
7. Tomentosi
8. Amplctentes
** Heads discoid; flowers whitish or purplish.
† Heads 2 cm. or more high; corollas deeply 5-lobed. § 13. Rugeliae
†† Heads 1 cm. high; corollas shortly 5-toothed. § 14. Mulgedifolii

2. Stems ligneous at the base.
  * Involucre barely calyculate; plants densely white-tomentose throughout. § 15. Incani
  ** Involucre calyculate; plants glabrous or pubescent. § 16. Suffruticosi

3. Shrubs or tree-like plants. § 17. Fruticosi

β. Leaves palmately veined. § 18. Palmatinervii
γ. Leaves pinnately veined; lateral nerves parallel-arculate, numerous and conspicuous. § 19. Multinervii

b. Stems abruptly terminated by a fore-shortening of the main axis and bearing at the top two to several, more or less pedunculate axillary compound corymbose cymes; oil-tubes richly developed in the peripheral portion of the stem. § 20. Terminales

B. Stems climbing. § 21. Streptothammi

Subgenus II. Pseudogynoxis Greenm. Style-branches terminated by triangular acute or acuminate dorsally hispidulous appendages. § 22. Convolvuloidei

** Subgenus I. Eusenecio Hoffm. **


Annuals, biennials or perennials; stems erect, scandent or climbing; leaves pinnately or palmately veined; heads radiate or discoid; style-branches truncate or rounded-obtuse, not infrequently bearing a penicillate tuft of hairs at the extreme tip. Sect. 1-21.

** Sect. 1. Annui Hoffm. **


Annual herbs; heads radiate or discoid; involucre narrowly campanulate or subcylindric, usually calyculate; achenes pubescent or glabrous. Sp. 1-7.
KEY TO THE SPECIES

A. Heads radiate or discoid; rays when present minute, barely surpassing the involucre.
   a. Plants viscid-pubescent. 1. *S. viscosus*
   b. Plants glabrous or pubescent, not viscid.
      a. Leaves coarsely dentate, auriculate-clasping by a broad base. 2. *S. mohavensis*
      b. Leaves chiefly pinnatifid, not greatly expanded at the base.
         I. Bracteoles black-tipped, heads discoid. 3. *S. vulgaris*
         II. Bracteoles not black-tipped; heads minutely radiate.
            1. Plants slightly pubescent. 4. *S. sylvaticus*
            2. Plants glabrous. 5. *S. aphanactis*

B. Heads radiate; rays conspicuous, much surpassing the involucre.
   a. Plants glabrous or pubescent, not arachnoid-tomentose.
      a. Leaves thin. 6. *S. californicus*
      b. Leaves thickish, succulent. 6a. var. *ammophilus*
   b. Plants arachnoid-tomentose. 7. *S. ampullaceus*


A strong-scented annual, viscid-pubescent throughout; stem erect, 2 to 4 dm. high, usually branched from the base; leaves sessile, half-clasping, 3 to 6 cm. long, two-thirds as broad, once or twice pinnatifid with angulate-sinuate lobes and rounded sinuses; heads radiate (rarely discoid); rays inconspicuous; achenes glabrous.

Distribution: eastern North America from Nova Scotia to Pennsylvania, near the coast.

Specimens examined:


New Brunswick: Schediac, 11 Sept., 1874, *Fowler* (Geol.
Surv. Canada Herb. 14882 and Kew Herb. 872, in part); Painsec Junction, 8 Aug., 1901, Churchill (Gray Herb.).

Massachusetts: along Boston and Albany Railroad, Sept., 1879, Boott (Gray Herb.); streets of Cambridge, 1 Sept., 1897, Robinson (Gray Herb.).

Rhode Island: wharves at Providence, 4 Sept., 1874, Congdon (Gray Herb.); streets of Providence, coll. of 1876, Bailey (Gray Herb. and Field Mus. Herb.); East Providence, 20 July, 1890, Collins (Mo. Bot. Gard. Herb.).

Pennsylvania: on ballast, Girard Point, July, 1877, Martin-dale (Gray Herb.) and Aug., 1877, Rothrock (Field Mus. Herb.). Introduced from Europe.


Glabrous throughout; stems erect or nearly so, 1.5 to 4 dm. high, freely branching; leaves membranous, ovate to oblong-ovate, 2 to 6 cm. long, 1 to 4 cm. broad, apiculate-acute, irregularly toothed, or somewhat laciniate-dentate, the lowermost narrowed into a petiolate base, those of the stem sessile and amplexicaul; inflorescence a terminal corymbose cyme; heads 1 cm. high on slender peduncles, discoid or with much reduced ligulate flowers; involucre calyculate with few short inconspicuous bracteoles, 18–20-flowered; bracts of the involucre about 13, linear, acute, slightly shorter than the flowers of the disk; achenes canescent pubescent.

Distribution: southern California, Arizona, and northern Mexico.

Specimens examined:

Arizona: Tempe, 21 April, 1892, Ganong & Blaschka (Gray Herb.).

Sonora: near the U. S. boundary line, 28 March, 1884, Pringle (Gray Herb. and U. S. Nat. Herb.).


Annual, 1 to 4 dm. high, glabrous or subfloccose pubescent especially in the axils of the upper leaves and in the inflorescence; leaves 2 to 8 cm. long, 0.5 to 2.5 cm. broad, more or less lyrately pinnatifid and angulate-toothed, lower leaves narrowed into a margined petiole, the upper sessile and semi-amplexicaul; heads discoid; the rather numerous small calyculate bracteoles as well as the bracts of the involucre usually black-tipped; achenes hirtellous-puberulent along the angles or ribs.

Distribution: Labrador, Newfoundland to North Carolina, west to Alaska, California, and New Mexico. Europe, Asia, and Africa.

Specimens examined:

Labrador: Hopedale, 4–6 Aug., 1897, Sornborger 162 (Gray Herb.).


Nova Scotia: dry soil, roadsides, North Sydney, Cape Breton, 21–25 July, 1901, Howe & Lang 639 (Gray Herb.);


Quebec: shore of St. Lawrence, Gaspé, Matane Co., *Forbes* (Gray Herb.) ; Gaspé Basin, 24 July, 1882, *Macoun 14889* (Geol. Surv. Canada Herb.).


Alberta: waste ground, Prince’s Island, near Calgary, 21 Aug., 1913, *Moodie 31* (Field Mus. Herb.).


Vermont: waste ground, Rutland, 1 Sept., 1899, Eggleston 1383 (Gray Herb.).

Massachusetts: Ipswich, Oakes (Gray Herb. and U. S. Nat. Herb.); Nahant, 6 July, 1878, Kellermann (Mo. Bot. Gard. Herb.); Revere Beach, 9 July, 1898, Greenman 515 (Gray Herb.); Cambridge, Chickering (U. S. Nat. Herb.); roadsides, West Cambridge, 29 Sept., 1894, local collection (Gray Herb.); Swampscott, 21 June, 1897, Weatherby (Gray Herb.); Ipswich, July, 1874, Morong (Field Mus. Herb.).

Rhode Island: waste places, Providence, Sept., 1844, Thurber (Gray Herb.); Providence, 2 July, 1892, Collins & Bailey (U. S. Nat. Herb.); Cat Swamp, Providence, 23 June, 1895, Collins (U. S. Nat. Herb.); Providence, 16 Aug., 1873, Congdon (Field Mus. Herb.); Providence, July, 1878, Bailey (Mo. Bot. Gard. Herb.).


Pennsylvania: Girard Point, Philadelphia, Aug., 1877, Rothrock (Field Mus. Herb.).


Maryland: vicinity of Oakland, 5 Sept., 1910, Steele (U. S. Nat. Herb.).


Ohio: Oberlin, June, 1892 and 1895, Ricksecker (U. S. Nat. Herb.).
Michigan: waste ground, Keweenaw Co., July, 1887, Farwell (Gray Herb.).

Wisconsin: St. Croix Co., coll. of 1888, Matthews (U. S. Nat. Herb.); Preble, 20 May, 1883, Schulte (Field Mus. Herb.); Green Bay, 11 July, 1897 and 29 Sept., 1901, Schulte (Field Mus. Herb.).

Nebraska: Valley Co., July, 1886, Webber (Field Mus. Herb.).

Montana: Willow Creek, 14 June, 1883 Scribner 123° (Gray Herb.); Columbia Falls, 21 June, 1894, Williams 965 (Gray Herb. and U. S. Nat. Herb.).


Colorado: valley near Empire, Sept., 1892, Patterson (Gray Herb.); along railroad at Georgetown, Aug.–Sept., 1892, Patterson (Field Mus. Herb.).


Oregon: cultivated fields, Sauvie Island, June, 1880, Howell (Gray Herb.); Portland, 1 June, 1884, Henderson 555 (Mo. Bot. Gard. Herb.); Portland, Feb., 1900, Lunell, and without date Sargent (Gray Herb.); Bonneville, 6 Aug., 1895,
Canby (U. S. Nat Herb.); Catching Inlet, 10 May, 1911, Smith 3700 (Field Mus. Herb.); Charleston Bay, 6 May, 1911, Smith 3668 (Field Mus. Herb.); North Slough, 1 March, 1911, Smith 3487; Coos Co., 2 March, 1911, Smith 3494 (Field Mus. Herb.); Portland, March, 1889, Drake & Dickson (Field Mus. Herb.); without definite locality, coll. of 1868–69, Kellogg & Harford 536 (U. S. Nat. Herb.).


Stem erect, simple or branched, 1 to 4 dm. or more high, usually somewhat pubescent; leaves more or less pinnatifid with unequal lobes, 2 to 15 cm. long, 1 to 8 cm. broad; the lower leaves petioled, the upper sessile, clasping and auriculate-sagittate; inflorescence naked or nearly so; heads cylindrical, sparingly calyculate, radiate; ligules barely surpassing the involucre, not infrequently much reduced; achenes canescent-pubescent.

Distribution: Newfoundland to Maine, Ohio, and on Pacific coast.
Specimens examined:


Quebec: beach of Gaspé Bay, Gaspé Co., 24-27 Aug., 1904, Collins, Fernald & Pease (Gray Herb.).

British Columbia: Vancouver Island, 6 Aug., 1909, Macoun 78950 and 78951 (Field Mus. Herb.).


Ohio: near Painsville, coll. of 1892, Hacker 123 (Gray Herb.).

Granite Falls, alt. 300 m., 28 Oct., 1911, *Smith 4224* (Field Mus. Herb.).


A slender annual, 1 to 3 dm. high, glabrous or somewhat tomentulose especially in the inflorescence; stem simple or branched; leaves linear to lanceolate, 1 to 4 cm. long, 1 to 12 mm. broad, entire to coarsely dentate or even pinnately lobed, glabrous or nearly so; the lower leaves narrowed into a petiolate base, the upper sessile; inflorescence terminal, few to several-headed; heads somewhat flask-shaped, 6 to 7 mm. high, radiate; involucre sparingly bracteolate, glabrous to tomentulose at the base; rays small, scarcely exceeding the involucre; achenes appressed-canescent.

Distribution: central California, northern Mexico and adjacent islands.

Specimens examined:

Lower California: Cedros Island, April, 1897, Brandegee (Gray Herb. and U. S. Nat. Herb.); San Quentin Bay, *Palmer 606* (Kew Herb.).


An herbaceous glabrous annual; stem erect simple or branched, 1 to 5 dm. high; leaves oblong-spatulate to lanceolate, entire to subpinnatifid, 2.5 to 7 cm. long, .2 to 2 cm. broad, often reddish; the lower leaves often narrowed to a subpetiolate base, the upper sessile and auriculate-clasping at the base; heads radiate, few to several in a loose cyme; bracts of the involucre about 21, often brownish or black-tipped, much exceeded by the yellow conspicuous rays; achenes canescent-pubescent.

Distribution: central California, vicinity of Monterey, south to northern Mexico.

Specimens examined:


Lower California:
Todos Santos Bay, July, 1883, Orcutt 708 (Gray Herb.) ; All Saints Bay, May, 1882, Fish (Gray Herb.) ; Punta Banda, 25 Jan., 1883, Orcutt 708 (Mo. Bot. Gard. Herb.) ; Nachoguero Valley, Schoenfeldt 3401 (U. S. Nat. Herb.).

Var. ammophilus (Greene) Greenm. comb. nov.


Leaves thickish, somewhat succulent, 2 to 4 cm. long, .2 to 1.5 cm. broad, the lower oblanceolate subentire, those of the stem auriculate-clasping, pinnately lobed into oblong or linear obtuse lobes.

Lower California : Cape San Quentin, 10 May, 1885, Greene (Gray Herb.), CO-TYPE.

The thick leaves of this variety give the plant a somewhat different appearance from typical forms of the species; but an examination of a large suite of specimens shows numerous transitional forms such as those secured by Fritchey, Pringle, Bigelow, Palmer 200, Orcutt 708, and K. Brandegee.


S. ampullaceus var. glaberrimus Engelm. & Gray, Boston Jour. Nat. Hist. 5: 250. 1845 (Pl. Lindh. 1: 42. 1845).

S. ampullaceus var. floccosus Engelm. & Gray, Boston Jour. Nat. Hist. 5: 250. 1845 (Pl. Lindh. 1: 42. 1845).
Annual, or occasionally becoming biennial, more or less floccose-tomentose throughout, somewhat glabrate; leaves oblong-obovate, acute to lanceolate and acuminate, 5 to 18 cm. long, 1 to 7 cm. broad, entire to coarsely and irregularly dentate; the lower leaves narrowed below into a winged petiole, those of the stem sessile, semiamplexicaul, gradually smaller towards the few to many headed cymose inflorescence; heads 10 to 12 mm. high, radiate, including the rays 1.5 to 3 cm. in diameter; involucre setaceous-calyculate; bracts of the involucre glabrous; achenes pubescent.

Distribution: eastern Texas.

Specimens examined:

Sect. 2. Eremophili Greenm.


Annual or biennial herbs, not infrequently becoming perennial by the development of a ligneous base; stems leafy; leaves laciniately pinnatifid; inflorescence a terminal corymbose or paniculate cyme; heads radiate, rays conspicuous; achenes glabrous or pubescent. Sp. 8–13.

Key to the Species

A. Plants glabrous; achenes smooth or slightly hirtellous.
   a. Heads 7 to 10 mm. high; involucral bracts 5 to 7 mm. long, usually conspicuously black-tipped.
      a. Involucre 3 to 5 mm. in diameter, 20–35-flowered ........................................... 8. S. MacDougalii
      β. Involucre 5 to 6 mm. in diameter, 35–50-flowered ............................................. 9. S. ambrosioides
   b. Heads 10 to 12 mm. high; involucral bracts 7 to 10 mm. long, not conspicuously black-tipped.
      a. Northern species (Canada and the U. S.) ...... 10. S. eremophilus
      β. Southern species (Mexico) ..................... 11. S. Townsendii

B. Plants more or less tomentose; achenes canescent-pubescent.
   a. Leaves at first tomentulose, later glabrate .......... 12. S. chihuahuensis
   b. Leaves permanently tomentulose .................... 13. S. durangensis


Glabrous throughout or slightly puberulent above; stem simple or branched, 5 to 8 dm. high, leafy to the inflorescence; leaves more or less laciniately pinnatifid, 3 to 10 cm. long, 1.5 to 5 cm. broad, segments linear to lanceolate, entire to coarsely and unequally dentate; inflorescence terminating the stem and branches in corymbose cymes; heads 7 to 10 mm. high, radiate; involucre narrowly campanulate, calyculate, 3 to 5 mm. in diameter; bracts of the involucre usually 13 (8–13), linear-
lanceolate, 4 to 5 mm. long, commonly black-tipped; ray-flow-
ers 5 to 8, light yellow; disk-flowers 14 to 30; achenes glab-
rous or slightly puberulent.

Distribution: New Mexico and Arizona.

Specimens examined:

New Mexico: Santa Fe Cañon, Aug., 1880, Snow (Mo. Bot. 
Gard. Herb.); Santa Fe Creek, 9 Sept., 1881, Engelmann 
(Mo. Bot. Gard. Herb.); Santa Fe, 14 Aug., 1895, Mulford 1292 
(Mo. Bot. Gard. Herb.); near Pecos, alt. 2040 m., 25 Aug., 1908, 
Standley 5311 (Mo. Bot. Gard. Herb.); Pecos River National 
Forest, alt. 2560 m., 10 Aug., 1908, Standley 4873 (U. S. Nat. 
Herb.); White Mountains, alt. 2130 m., 6 Aug., 1897, Wooton 
290 (Gray Herb. and Mo. Bot. Gard. Herb.); White Moun-
tains, alt. 2255 m., 25 Aug., 1907, Wooton & Standley 3672 
(U. S. Nat. Herb.); head of Bear Creek, coll. of 1903, Plummer 
(Gilmore's Ranch, White Mountains, alt. 
2280 m., 23 Sept., 1906, Standley (Mo. Bot. Gard. Herb.); G. 
O. S. Ranch, Grant Co., 27 Aug.-12 Sept., 1911, Holzinger 
(U. S. Nat. Herb.).

Arizona: Walnut Cañon, alt. 2130 m., MacDougal 342 
(Gray Herb. and Field Mus. Herb.), co-type; near Flagstaff, 
Herb.); Mt. Agassiz, alt. 3050 m., 10 Sept., 1909, Pearson 315 
(U. S. Nat. Herb.); Humphrey Peak, July, 1883, Rusby 337 
(Gray Herb. and Field Mus. Herb.); Barfoot Park, Chiri-
cahua Mountains, 24 Oct., 1906, Blumer 1484 (U. S. Nat. Herb. 
and Field Mus. Herb.); Huachuca Mountains, Sept., 1882, 
Lemmon 2785 (Gray Herb., U. S. Nat. Herb., and Field Mus. 
Herb.); Huachuca Mountains, 17 Oct., 1903, Mearns 2581 (U. 
S. Nat. Herb.).

1915.

**S. eremophilus** Gray, Pl. Fendl. 108. 1849, as to plant of 
Fendler; Pac. Rail. Rept. 4 : 111. 1856, as to plant of Bigelow; 
Syn. Fl. N. Am. 1²: 392. 1884, and ed. 2. 1886, in part, not


Herbaceous perennial, glabrous or essentially so throughout; stems one to several from a ligneous base, 3 to 5 dm. high; leaves oblanceolate to ovate-lanceolate in general outline, 3 to 13 cm. long, 1 to 5 cm. wide, more or less laciniately pinnatifid into linear to lanceolate, entire to coarsely and unequally dentate divisions; inflorescence a terminal corymbose cyme; heads usually numerous, 7 to 10 mm. high, radiate; involucrc subcampanulate, 5 to 7 mm. in diameter, calyculate; bracts of the involucrc usually 13, linear-lanceolate, 5 to 7 mm. long, commonly black-tipped; ray-flowers 5 to 8; disk-flowers 30 to 45; achenes hirtellous-puberulent.

Distribution: Wyoming to New Mexico, Idaho, and Arizona.

Specimens examined:


New Mexico: pine forest, Jicarilla Apache Reservation,


Arizona: Navajo Indian Reservation, about the north end of the Carrizo Mountains, 29 July, 1911, Standley 7376 (U. S. Nat. Herb.).

Among the specimens here cited, a few, particularly Parry’s 26, Overholts’, Mackenzie’s 208, and Engelmann’s plant from Upper Clear Creek Valley, might be almost equally well referred to the preceding species, S. macDougalii, to which S. ambrosioides is very closely related; but in general the latter may be distinguished by the slightly larger and more numer-
ously flowered heads and usually, but not always, less pinnatisect leaves.


An herbaceous perennial, glabrous or slightly puberulent in the inflorescence; stems erect, 3 to 8 dm. high, striate; leaves more or less laciniately pinnatifid with linear, lanceolate or oblong, entire or coarsely and unequally dentate divisions; the lower leaves petiolate, the upper subsessile; inflorescence terminating the stem in a somewhat leafy corymbose or panicle cyme; heads rather large, 10 to 12 mm. high, radiate; involucre campanulate conspicuously calyculate; bracts of the involucre usually 13, linear-lanceolate, acute, 7 to 9 mm. long, glabrous, minutely brownish- or black-tipped; ray-flowers 8 to 10; disk-flowers 40 to 60; achenes ribbed, glabrous, or slightly hirtellous-puberulent.

Distribution: northwestern Canada to Nebraska, Colorado, and Utah.

Specimens examined:


Alberta: “on gravelly banks of Cedar Lake, Lat. 54°,” *Richardson* (Kew Herb.), type; Pembina, coll. of 1873, *Coues* (Gray Herb.); on damp banks, Bow River at Morley, 6 Sept.,


var. *Kingii* (Rydb.) Greenm. comb. nov.


*S. eremophilus* Eaton, Bot. King Exp. 191. 1871, as to plant of Watson.


Leaves oblanceolate to oblong-lanceolate, coarsely dentate to pinnatisect with relatively broad divisions; but through several specimens connecting directly with the above species.

Specimen examined:


11. *S. Townsendii* Greenm.1

Herbaceous perennial, glabrous throughout; stem 6 to 10 dm. high, striate, often purplish; leaves coarsely, unequally

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1 *Senecio Townsendii* Greenm. sp. nov., herbaceus perennis ubique glabrus; caule 6–10 dm. alto, striato saepe purpurascenti; foliis inaequaliter et remote
and remotely dentate to laciniately pinnatifid, oblanceolate to oblong-lanceolate in general outline, 3 to 10 cm. long, 1 to 4 cm. broad, divisions linear and entire to dentate, acute or obtuse; lower leaves petiolate, the upper sessile; inflorescence a loose several to many-headed corymbose cyme; heads 10 to 13 mm. high, radiate; involucre narrowly campanulate, calyculate, glabrous; bracts of the involucre commonly 13, linear-lanceolate, 8 to 10 mm. long, terminated by a small black or brownish penicillate tip; flowers pale yellow; ray-flowers 5 to 8, occasionally much reduced; disk-flowers 35 to 50; achenes glabrous.

Distribution: northern Mexico.


The Townsend and Barber specimens have been distributed as "Senecio Chihuahuanus Wats." and the Jones plant was distributed as "Senecio eremophilus" under which names they may be looked for in herbaria.


An herbaceous perennial; stem erect, 4 to 5 dm. high from a rather slender rootstock, striate-angulate, somewhat purplish; early leaves oblanceolate, 3 to 5 cm. long, 1 cm. broad, laciniately dentate, arachnoid-tomentulose on both surfaces; later stem-leaves short-petiolate, or subsessile, oblong-ovate in general outline, about 8 cm. long, one-half to two-thirds as
broad, subbipinnate, at first tomentulose, later becoming glabrous or essentially so, divisions narrow, unequal, cartilaginoid-apiculate; inflorescence a terminal corymbose cyme; heads 10 to 12 mm. high, radiate; involucre cylindric-campanulate, calyculate with short linear subulate bracteoles; bracts of the involucre 7 to 9 mm. long, brownish- or black-tipped, shorter than the numerous flowers of the disk; ray-flowers about 8; achenes canescent-pubescent.

Distribution: northern Mexico.

Specimens examined:


An herbaceous annual, or becoming perennial by the development of a ligneous base; stem simple or branched, erect, 3 to 4 dm. high, arachnoid-tomentose; leaves lanceolate, 2 to 9 cm. long, 1 to 2.5 cm. wide, more or less pinnately divided, permanently arachnoid-tomentulose on both surfaces, lower leaves petiolate, upper sessile; inflorescence a terminal tomentulose corymbose cyme; heads numerous, 8 to 10 mm. high, radiate, calyculate; involucre campanulate, glabrous or nearly so; bracts of the involucre 13, linear-lanceolate, 5 to 6 mm. long, minutely black-tipped, penicillate; ray-flowers 5 to 8, ligules pale yellow; disk-flowers 20 to 30; achenes canous-hirtellous.

Distribution: northern Mexico.

Specimen examined:

Sect. 3. **Jacobaeae** DC.

§ 3. **Jacobaeae** DC. Prodr. 6: 348. 1837; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. IV, Abt. 5, 297. 1892; Greenm.

Biennial or perennial herbs with lyrate or 2-3-pinnatisect leaves and radiate heads. Sp. 14-16.

**KEY TO THE SPECIES**

A. Stem and leaves glabrous or nearly so; involucral bracts narrow, about 1 mm. broad; bracteoles usually black-tipped


B. Stems and leaves more or less permanently floccose-tomentulose; involucral bracts 1.5 to 2 mm. broad; bracteoles not black-tipped.

a. Upper stem-leaves once pinnate


b. Upper stem-leaves 2-3-pinnatisect


Annual or biennial, sometimes becoming perennial, glabrous throughout or slightly pubescent; stem erect, 3 to 6 dm. high, simple or branched, striate; leaves lanceolate to obovate-lanceolate in general outline, 3 to 10 cm. long, 1 to 4 cm. broad, laciniately lobed or subpinnatiscent, thin in texture, the lobes again sharply dentate; the lower leaves narrowed into a subpetiolate base, the upper sessile and semiamplexicaul; inflorescence a terminal corymbose cyme; heads 8 to 10 mm. high, radiate; involucre calyculate with black-tipped bracteoles; bracts of the involucre about 21, linear-lanceolate, acute, 6 to 7 mm. long; ray-flowers about 13; disk-flowers numerous; achenes glabrous or slightly hirtellous.

Distribution: on ballast near Philadelphia. Introduced from Europe.

Specimen examined:
Pennsylvania: on ballast, Philadelphia, July, 1880, Martin-dale (Gray Herb.).


An herbaceous biennial or perennial, more or less floccose-tomentulose throughout and on the stem and lower leaf-surface often intermixed with hirsute hairs; stems erect, 3 to 10 dm. high, simple or branched; leaves lyrate pinnatifid to pinnatisect, 2 to 10 cm. long, 1 to 6 cm. broad, the lobes subentire, blunt, and submucronate to sharply dentate; lowermost leaves narrowed into a subpetiolate base, the upper sessile and semiamplexicaul; inflorescence a terminal few-to many-headed corymbose cyme; heads about 1 cm. high, radiate; involucre campanulate, calylcate; bracts of the involucre usually 13, lanceolate-oblong, 4 to 5 mm. long, glabrous or slightly floccose-tomentulose, with rather broad scarious margins; ray-flowers about 13; disk-flowers numerous, 50 to 60; achenes hirtellous.

Distribution: on ballast near Philadelphia. Introduced from Europe.

Specimens examined:
Pennsylvania: on ballast, Philadelphia, 30 Aug., 1879, Parker (Gray Herb.).
New Jersey: on ballast, Kaighn’s Point, Burk (Field Mus. Herb.).


Jacobaea vulgaris Vahl in Fl. Dan. 6: pl. 944. 1787; Gaertn. Fruct. 2: 445. pl. 170. fig. 1. 1791. An erect, biennial or perennial herb, 3 dm. or more high, at first usually arachnoid-tomentulose, more or less glabrate; basal leaves petiolate, somewhat lyrate; stem leaves sessile, semiamplexicaul, ovate-oblong in general outline, 3 to 15 cm. long, 1.5 to 7 cm.
broad, 2–3-pinnatisect; inflorescence a terminal corymbose cyme; heads numerous, radiate; achenes pubescent.

Distribution: Newfoundland to New Jersey, occurring along roadsides, in pastures, and on ballast. Introduced from Europe.

Specimens examined:


Quebec: on ballast-filling about fish houses, York, Gaspé Co., 25 Aug., 1904, Collins, Fernald & Pease (Gray Herb.).

Ontario: Burlington, 23 Aug., 1883, Burgess 14857 (Geol. Surv. Canada Herb.).


Sect. 4. Sanguisorboidei Greenm.

§ 4. Sanguisorboidei Greenm. Monogr. Senecio, I. Teil, 22,

Annuals, biennials, or perennials, often forming merely a rosette of leaves during the first year; stems erect, 1.5 to 10 dm. high from a distinctly annual root or from a rather stout rootstock; leaves once, twice, or thrice pinnately divided; heads numerous; achenes glabrous or pubescent. Sp. 17–29.

### Key to the Species

#### A. Annuals or biennials.

a. Bracts of the involucre usually 13, linear-lanceolate, 1 to 2.5 mm. broad ............. 17. *S. sanguisorboides*

b. Bracts of the involucre usually 21, linear or linear-lanceolate, 0.5 to 1.5 mm. broad.

a. Lateral leaf-segments not abruptly contracted into a narrow base.

1. Plants of southeastern United States. 18. *S. glabellus*

II. Plants of southwestern Texas and northern Mexico ................. 19. *S. Greggii*

b. Lateral leaf-segments abruptly contracted into a narrow base .......... 20. *S. imparipinnatus*

#### B. Perennials; upright stem from a horizontal, ascending or suberect rootstock.

a. Leaves 2–3-pinnatisect; segments narrow .... 21. *S. Millefolium*

b. Leaves once pinnate; segments narrowly obovate to subreniform.

a. Heads numerous, small, 5 to 10 mm. high.

I. Involutercal bracts usually 21.

1. Leaves glabrous; achenes hirtellous. 22. *S. tampicanus*

2. Leaves pubescent beneath; achenes glabrous ....................... 23. *S. hypotrichus*

II. Involutercal bracts usually 13.

1. Lateral leaf-divisions longer than broad.

* Midrib glabrous .............. 24. *S. Sanguisorbae*

** Midrib floccose-tomentulose ..... 25. *S. pinnatisectus*

2. Lateral leaf-divisions as broad as long ......................... 26. *S. coahuilensis*

b. Heads fewer and larger, 10 to 14 mm. high.

I. Leaves pinnately divided nearly to the midrib.

1. Leaf-divisions few, cuneate to reniform ............ 27. *S. leonensis*

2. Leaf-divisions many, cuneate to linear .............. 28. *S. montereyana*

II. Leaves pinnately divided slightly more than half-way from margin to midrib .............. 29. *S. zimapanicus*

Annual or biennial, glabrous or slightly white tomentulose in the axils of the leaves; stem 1.5 to 5 dm. high, striate; leaves usually pinnately divided into cuneate to reniform dentate or crenate-dentate divisions, the terminal division ovate-reniform, 1 to 5 cm. broad; basal and lower stem-leaves petiolate and occasionally undivided; upper stem-leaves sessile and amplexicaul; inflorescence a terminal few to several-headed corymbose cyme; heads radiate; involucre campanulate, barely calyculate; bracts of the involucre usually 13 (rarely 16), lanceolate, 6 to 6.5 mm. long, glabrous; ray-flowers 8 to 10; disk-flowers 30 to 50; achenes ribbed, glabrous.

**Distribution:** mountains of New Mexico.

**Specimens examined:**


*S. lyratus* Michx. Fl. Bor. Am. 2: 120. 1803, not L.

S. carolinianus Spreng. Syst. 3: 559. 1826.


Annual or biennial, glabrous or slightly tomentulose in the axils of the leaves; stems erect 1 to 10 dm. high, striate; radical leaves petiolate, lyrate, occasionally undivided; those of the stem petiolate or sessile and semiamplexicaul, pinnately divided into rather remote, narrowly cuneate to sub-reniform unequal divisions; inflorescence a terminal corymbose cyme; heads 6 to 8 mm. high, radiate; ray-flowers 8 to 12; disk-flowers about 50; achenes usually hirtellous-puberulent.

Distribution: North Carolina west to Illinois, Missouri, and South Dakota, south to Florida and eastern Texas. Common on river bottoms and flood-plains.

Specimens examined:

North Carolina: near Wilmington, April, 1888, McCarthy (U. S. Nat. Herb.); without locality, Curtis (Gray Herb.).

South Carolina: Goose Creek, 19 May, 1885, A. C. & F. W. Maier (Gray Herb.); swamps, Summerville, April, 1890, Taylor (Field Mus. Herb.).

Georgia: Macon, coll. of 1875, Curtiss (U. S. Nat. Herb.); central Georgia, coll. of 1846, Porter (Gray Herb.); Butler Island, McIntosh Co., 27 May, 1909, Smith 2185 (Field Mus. Herb.).

Smyrna, *Burgess 563* (Field Mus. Herb.); Gulf Hammock, April, 1876, *Garber* (Field Mus. Herb.).


Mississippi: damp fields, North Carrollton, 21 April, 1899, *Clute 24* (Field Mus. Herb.); without locality, coll. of 1843, *Holton* (Kew Herb.).


Batesville, Butler Co., 21 May, 1908, Smith 534 (Field Mus. Herb.); St. Louis, coll. of 1832, Drummond (Kew Herb.); St. Louis, Riehl 382 (Kew Herb.).


Forma robustior, forma nova.

Stout herb; upper stem-leaves 1.5 to 2 dm. long, 8 to 10 cm. wide; the large lateral obovate leaf-lobes alternating with smaller wedge-shaped divisions of the leaf.

Georgia: ditch banks, near Savannah, 21 March, 1882, J. D. Smith (Gray Herb.), type. This plant appears to be a giant form with rather marked foliage.


Annual or biennial, glabrous or with a slight tomentum in the leaf-axils and on the upper side of the leaf along the mid-
rib; stems one to several from a common base, 1.5 to 4 dm. high, striate; leaves lyrate to pinnately divided into cuneate to subrotund divisions; inflorescence a terminal corymbose cyme; heads 5 to 8 mm. high, radiate; involucre campanulate, slightly calyculate; bracts of the involucre about 21, linear-lanceolate, 3 to 5 mm. long, glabrous; ray-flowers 8 to 12; disk-flowers 45 to 60; achenes hispidulous.

Distribution: southern New Mexico, western Texas, and northern Mexico.

Specimens examined:

New Mexico: banks of the Rio Grande near El Paso, Wright 1413 (Gray Herb.).


Chihuahua: valley of Rio Parral, near Santa Rosalia, 21 April, 1847, Gregg 11, (Gray Herb.) co-type; valley near Ortiz, 11 April, 1887, Pringle (Field Mus. Herb.).


Annual or biennial, glabrous or slightly floccose-tomentulose in the axils of the leaves; stems slender, 1.5 to 4 dm. high, simple or branched from the base; leaves 2 to 10 cm. long, 1 to 3 cm. broad, lyrate to pinnately divided or the lowermost occasionally undivided; the upper stem-leaves remote, sessile, and pinnately divided into small linear and entire to abruptly cuneate and unequally toothed lateral divisions; inflorescence a terminal few-headed corymbose cyme; heads 6 to 8 mm. high, radiate; involucre campanulate, glabrous, minutely calyculate; bracts of the involucre usually 21, linear-lanceolate, 3 to 5 mm. long, acute; ray-flowers 8 to 12; disk-flowers commonly 50 to 60; achenes hirtellous-puberulent.
Distribution: western Louisiana, Oklahoma, and Texas.
Specimens examined:

Louisiana: without locality, *Leavenworth* (Gray Herb. and Kew Herb.).


21. *S. Millefolium* Torr. & Gray, Fl. N. Am. 2: 444. 1843; Gray, Syn. Fl. N. Am. 12: 392. 1884, and ed. 2, 1886; Chap-
man, Fl. Southern U. S., ed. 3, 266. 1897; Small, Fl. South-
eastern U. S. 1305. 1903, and ed. 2, 1913.

An herbaceous perennial, glabrous or with a white floccose-
tomentum at the base of the stem and in the axils of the
leaves; stems 3 to 7 dm. high, striate; leaves bi-tri-pinnately
dissected into linear segments; basal and lower stem-leaves
petiolate, 1 to 2.5 dm. long, 1.5 to 6 cm. wide, the upper ones
sessile; inflorescence terminating the stem in a corymbose
cyme; heads 8 to 10 mm. high, radiate; involucre campanulate,
sparsingly calyculate, glabrous; bracts of the involucre 4 to
6 mm. long; ray-flowers 8 to 12; disk-flowers numerous, usual-
ly 50 to 60; achenes hirtellous-puberulent.

Distribution: mountains of North Carolina and South
Carolina.

Specimens examined:

North Carolina: slope of Caesar’s Head, 3 Sept., 1876,
Engelmann (Mo. Bot. Gard. Herb.) ; without locality, coll. of
1888, Boynton (U. S. Nat. Herb.) ; dry, rocky places on White
Oak Mountains, Polk Co., alt. 850 m., 4 May, 1897, Biltmore
Herb. 1301b (Gray Herb., Field Mus. Herb., and Mo. Bot.
Gard. Herb.) ; Skyuka Mountains, Polk Co., 25 May, 1899,
Churchill (Gray Herb.).

South Carolina: Table Rock, coll. of 1842, Buckley (Gray
Herb. and Mo. Bot. Gard. Herb.) ; “Carolina,” Fraser (Gray
Herb.), part of type; Caesar’s Head, Aug., 1876, Canby (U.
S. Nat. Herb.).


Glabrous throughout; stem 4 dm. or more high, terete,
striate, leafy; leaves thin, pinnately divided into cuneate to
obovate, unequally dentate divisions; lower leaves petiolate, 1
to 3 dm. long, the upper ones sessile and amplexicaul by a
large stipular-like base; inflorescence a terminal compound
corymbose many-headed cyme; heads small, 5 to 7 mm. high,
radiate; involucre campanulate, glabrous, minutely calyculate; 
braacts of the involucre 21, linear-lanceolate, 3 to 4 mm. long;
ray-flowers about 13; disk-flowers numerous, 70 to 90; achenes hirtellous along the ribs.

Distribution: eastern Mexico.

Specimens examined:
Tamaulipas: Tampico, coll. of 1827, Berlandier 186 (Berlin Herb., tracing and fragments in Gray Herb.), co-type.
Vera Cruz: Wartemberg, near Tantoyuca, coll. of 1858, Ervendberg 90 (Gray Herb.); without locality, Liebmann 172 (Copenhagen Herb., tracing and fragments in Gray Herb.).

Puebla: near Metaltouyca, alt. 240 m., 27 Feb., 1898, Goldman 74 (U. S. Nat. Herb, and Gray Herb.).
San Luis Potosi: without definite locality, Parry & Palmer 533 (Gray Herb.).

23. _S. hypotrichus_ Greenm.¹


An herbaceous perennial; stem 7 dm. high, erect, striate, glabrous, somewhat purplish, branched above; leaves pinnately divided into cuneate to rhombo-ovate dentate unequal divisions, glabrous above, crisp-hirsute beneath; lower leaves including the petiole 2 to 3 dm. long, 4 to 9 cm. broad, the upper stem-leaves sessile, semiamplexicaul and gradually reduced towards the terminal corymbose cyme; heads 8 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate; braacts of the involucre usually 21, linear-lanceolate,

¹_Senecio hypotrichus_ Greenm. sp. nov. herbaceus perennis; caule erecto circiter 7 dm. alto tereti striato stramineo vel plus minusve purpurascenti glabro, superne ramoso; foliis pinnatifidis, inferioribus petiolatis usque ad 3 dm. longis, 4 to 9 cm. latis, superioribus sessilibus et semiamplexicaulis gradatim reductis, lacininis angustae cuneatis vel obovatis vel rhombo-ovatis suberecto-dentatis supra glabris subtus crispo-hirsutis; inflorescentiis terminalibus corymbose-paniculatis; capitulis 8-10 mm. altis radiatis; involucri squamis plerumque 21 lineari-lanceolatis 5-6 mm. longis glabris; floresculis liguliferae saepius 13, ligulis oblongis, 6-7 mm. longis, 2.5 mm. latis, 4-5-nervis; floribus disci 00-70; acheniis glabris. —Region of San Luis Potosi, Mexico, alt. 1850–2440 m., coll. of 1878, Parry & Palmer 533 (U. S. Nat. Herb.), type. The Gray Herbarium specimen of Parry and Palmer’s No. 533 differs from the United States National Herbarium specimen above cited in having glabrous leaves, smaller and more numerous flowered heads and hirtellous achenes; it has been referred to _S. tampicanus_ DC.
5 to 6 mm. long, glabrous; ray-flowers 13, rays oblong, 6 to 7 mm. long, 2.5 mm. broad, 4–5-nerved; disk-flowers 60 to 70; achenes glabrous.

Distribution: central Mexico.


An herbaceous perennial; stem erect, 3 to 10 dm. high, striate, glabrous, simple or branched; leaves pinnately divided, the radical and lower stem-leaves petiolate including the petiole 1 to 4 dm. long, 3 to 13 cm. broad, glabrous on both surfaces or slightly subarachnoid beneath, the upper stem-leaves sessile and more or less amplexicaul; lateral leaf-segments oblong-cuneate to oblong-ovate, 1 to 7 cm. long,.3 to 5.5 cm. broad, rather coarsely dentate, the terminal segment usually broadly obovate; inflorescence a terminal many-headed corymbose cyme; heads 6 to 8 mm. high, radiate; involucre narrowly campanulate, sparingly calyculate; bracts of the involucre 8 to 13, linear-lanceolate 4.5 to 6 mm. long, glabrous; ray-flowers 5 to 8; disk-flowers 15 to 25; achenes glabrous.

Distribution: southern Mexico.

Specimens examined:

Hidalgo: by brooks, Sierra de Pachuca, alt. 3050 m., Aug., 1902, *Pringle* 9959 (Gray Herb. and Mo. Bot. Gard. Herb.); Sierra de Pachuca, 1 Sept., 1903, *Rose & Painter* 6739 (Gray Herb.).

3044 (Field Mus. Herb. and Mo. Bot. Gard. Herb.); Mt. Popocatepetl, 7 and 8 Aug., 1901, Rose & Hay 6069 (U. S. Nat. Herb.); without locality, Uhde 582, 602, 603, 609, 624 (Berliner Herb.); without locality, coll. of 1848-49, Gregg 673 (Gray Herb.).


An herbaceous perennial; stem erect, 4 dm. or more high, striate, glabrous or slightly tomentulose; leaves pinnately divided, the lower petiolate, including the petiole 1 to 3 dm. long, 3 to 8 cm. broad, the upper sessile and amplexicaul, at first white floccose-tomentulose, later glabrate except for the persistent tomentum along both sides of the rhachis; lateral divisions of the leaf narrowly oblong, sharply serrate-dentate, terminal division obovate-cuneate; inflorescence a terminal compound compact corymbose cyme; heads numerous, 6 to 7 mm. high, radiate; involucre calyculate, glabrous; bracts of the involucre usually 13; ray-flowers commonly 6 to 8; disk-flowers 15 to 20; achenes glabrous.

Distribution: southern Mexico.

Specimens examined:

Hildalgo: Real del Monte, Ehrenberg 386 (Berlin Herb. and Gray Herb.), also 386a, 386b (Berlin Herb.); Real del Monte, coll. of 1830, Graham (Gray Herb. and Kew Herb.).

Michoacan (?): Angangueo, Chrismar (Berlin Herb.);
“Cuesta de las papao Angangueo,” Schiede (Berlin Herb.).

Mexico, without definite locality: Bates, Mackenzie, and also Parkinson (Kew Herb.).

This species is closely related to the preceding, but differs in the narrower lateral leaf-segments, slightly smaller heads,
and persistent floccose tomentum along the rhachis or midrib.


An herbaceous perennial, glabrous or essentially so throughout; stem erect, 3 to 8 dm. high, branched, striate; leaves pinnately divided into obovate to subreniform cuneate-dentate divisions, thickish and firm in texture, glabrous on both surfaces or slightly pubescent on the veins beneath; lower leaves including the petiole 1 to 3 dm. long, 2 to 5 cm. broad, the upper stem-leaves sessile and amplexicaul; inflorescence terminating the stem and branches in a compound corymbose cyme; heads 7 to 10 mm. high, radiate; involucre campanulate, calyculate with a few small bracteoles, glabrous; bracts of the involucre 13 to 18, linear-lanceolate, 4 to 6 mm. long, thickish; ray-flowers 8 to 10, rays oblong, 3 to 5 mm. long, 4-nerved; disk-flowers 35 to 45; achenes ribbed, glabrous.

Distribution: northern Mexico.


An herbaceous perennial, more or less lanate-tomentose throughout, somewhat glabrate in age; stem 2 to 3 dm. high, leafy at the base, essentially naked above; leaves petiolate, pinnately divided, including the petiole 8 to 12 cm. long, about 3 cm. broad, at first lanate-tomentulose on both surfaces, later glabrate; divisions of the leaf rather coarsely, somewhat unequally and sharply dentate, the terminal segment subreniform, the lateral ones (3 to 6 on either side) obovate-cuneate; heads few, about 1 cm. high, radiate; involucre campanulate, slightly calyculate and, as well as the bracteate peduncle, tomentulose; bracts of the involucre about 13; disk-flowers numerous, 50 to 60; achenes pubescent.
Distribution: northern Mexico.
Specimen examined:
Nuevo Leon: Sierra Madre, near Monterey, 1 June, 1889, Pringle 2894 (Gray Herb.), type.


An herbaceous perennial, more or less white-tomentose throughout; stems one to several, 2.5 to 4 dm. high, from a rather stout ascending rootstock; leaves mostly radical, including the petiole 1 to 2 dm. long, 1.5 to 3 cm. broad, pinnately divided into narrow, oblong, cuneate to sublinear, entire or few-toothed divisions, at first white-floccose-tomentose on both surfaces, somewhat glabrate above; heads few, 10 to 12 mm. high, radiate, on long naked peduncles; involucre campanulate, calyculate with minute bracteoles, tomentose; bracts of the involucre slightly shorter than the numerous flowers of the disk; ray-flowers about 12; achenes hirtellous-pubescent.

Distribution: northern Mexico.
Specimens examined:


An herbaceous perennial; stems 3 to 4.5 dm. high, simple, leafy below, nearly naked above, striate, more or less pubescent with flaccid-hirsute, jointed, and somewhat matted hairs; leaves mostly basal, sessile or essentially so, 3 to 18 cm. long, 1 to 3 cm. broad, pinnately lobed or divided into oblong-ovate dentate divisions, flaccid-hirsute or subarachnoid-pubescent on both surfaces, more densely so beneath; inflorescence a terminal corymbose few-headed cyme; heads large, 10 to 14 mm. high, conspicuously calyculate, radiate; bracts of the involucre commonly 21 (15-21) linear-lanceolate, 7 to 9 mm. long, thickish, glabrous except at the penicillate tip; ray-
flowers 12 to 15, rays oblong, 10 to 12 mm. long; disk-flowers numerous; achenes about 3 mm. long, ribbed, slightly pubescent on the ribs.

Distribution: eastern Mexico.

Specimens examined:
Hildago: Zimapan, Coulter 423 (Kew Herb.), type.
Tamaulipas: near Miquihuana, alt. 2140 to 2740 m., 10 June, 1898, Nelson 4492 (Gray Herb. and U. S. Nat. Herb.).

Sect. 5. Bolanderiani Greenm.


Slender, herbaceous perennials; stems erect or nearly so, 1 to 5 dm. high, from a slender more or less horizontal rootstock; leaves undivided and orbicular-ovate to pinnatifid; heads of medium size, about 1 cm. high, radiate; achenes glabrous. Sp. 30–32.

A. Stems 1.5 to 5 dm. high, leafy to the inflorescence.
   a. Leaves usually pubescent beneath; bracts of the involucre 6 to 9 mm. long, more or less hairy... 30. S. Bolanderi
   b. Leaves glabrous on both surfaces; bracts of the involucre 5 to 6.5 mm. long, glabrous... 31. S. Harfordii

B. Stems 1 to 2 dm. high, leafy only at the base... 32. S. Flettii


A slender herbaceous perennial; stems ascending or erect, from a creeping rootstock, 1.5 to 5 dm. high, striate, often somewhat purplish; radical and lower stem-leaves undivided and crenately lobed-dentate to pinnately divided into oblong, obovate to subrotund, crenate to sharply dentate divisions, glabrous above, usually pubescent beneath, including the petiole .5 to 1.5 dm. long, 1 to 3 cm. broad; the upper stem-leaves sessile; inflorescence terminating the stem in a few-headed subcorymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, calyculate, usually tawny pubescent; bracts of the involucre about 13, linear-lanceolate, 6 to 9 mm.
long; ray-flowers 5 to 8; disk-flowers rather numerous, 25 to 45; achenes glabrous.

Distribution: California and Oregon, near the coast.

Specimens examined:
California: on sand-stone bluffs at the mouth of the river below Mendocino City, May, 1866, Bolander 4816 (Gray Herb., Field Mus. Herb., and Mo. Bot. Gard. Herb.), type; Humboldt, coll. of 1868–69, Kellogg & Harford 539 (U. S. Nat. Herb. and Mo. Bot. Gard. Herb); Humboldt, coll. of 1866, Kellogg 539 (Gray Herb.); Redwoods, Eel River, coll. of 1878, Rattan 33 (Gray Herb.); near Crescent City, Del Monte Co., June, 1892, Burt-Davy & Blasdale 1072 (Field Mus. Herb.).

Oregon: Coast Mountains, Lat. 42°, June, 1884, Howell (Gray Herb.); Newport, June, 1892, Mulford (Mo. Bot. Gard. Herb.).


A slender herbaceous perennial, glabrous throughout; stem erect or ascending from a creeping rootstock, 2 to 5 dm. high, usually leafy; leaves mostly pinnately divided into cuneate to subrotund crenate to laciniate-dentate divisions; the radical and lower stem-leaves petiolate, including the petiole 4 to 14 cm. long, 1 to 5 cm. broad, occasionally undivided, subrotund and crenately lobed and the lobes again crenate-dentate, thin in texture, pale green in the dried state; the upper stem-leaves sessile; inflorescence a few-headed corymbose cyme; heads 8 to 10 mm. high, radiate, including the conspicuous yellow rays 1.5 to 2 cm. in diameter; bracts of the involucre usually 13, narrowly lanceolate, 5 to 6 cm. long, acuminate, acute, glabrous; ray-flowers usually 5 (–8); disk-flowers 15 to 25; mature achenes 2.5 to 3.5 mm. long, glabrous.

Distribution: mountains of Washington and Oregon.

Specimens examined:
Washington: on mountains near the Lower Cascades, Skamania Co., 29 May, 1886, Suksdorf (Gray Herb.); in


An herbaceous perennial, 1 to 2 dm. high, glabrous throughout; leaves mostly basal, petiolate, including the petiole 4 to 12 cm. long, 1.5 to 2 cm. broad, undivided, ovate-orbicular and crenate-dentate to pinnately parted, upper stem-leaves few, 1 to 3, incisely pinnate to linear and bractiform; inflorescence terminating the stem in a few-headed corymbose cyme; heads about 1 cm. high, radiate; involucre narrowly campanulate, sparingly calyculate; bracts of the involucre 8 to 13, linear-lanceolate, 5 to 6 mm. long, thickish, glabrous; ray-flowers commonly 5; disk-flowers about 20; achenes glabrous.

Distribution: Washington.

Specimens examined:

(To be continued.)
EXPLANATION OF PLATE

PLATE 17

Senecio mohavensis Gray
California

From the type specimen, Lemmon No. 3129, in the Gray Herbarium of Harvard University.
EXPLANATION OF PLATE

PLATE 18

Senecio durangensis Greenm.
Mexico

From the type specimen, Pringle No. 10105, in the Gray Herbarium of Harvard University.
GREENMAN—MONOGRAPH OF SENECIO

COCKAYNE, BOSTON
EXPLANATION OF PLATE

PLATE 19

Fig. 1. Senecio leonensis Greenm.
   Mexico
From the type specimen, Pringle No. 2894, in the Gray Herbarium of Harvard University.

Fig. 2. Senecio coahuilensis Greenm.
   Mexico
From the type specimen, Palmer No. 755, in the Gray Herbarium of Harvard University.
GREENMAN—MONOGRAPH OF SENECIO

COCKAYNE, BOSTON

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