A REVISION OF THE NORTH AMERICAN SPECIES OF THE GENUS THERMOPSIS[1]

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INTRODUCTION

During a monographic treatment of the genus *Baptisia,* interest was aroused in the state of taxonomic confusion into which its closest generic affinity, *Thermopsis,* had fallen. According to the "Index Kewensis" and the Gray Herbarium Catalogue, it is comprised of thirty species: eight Asiatic, not considered in this revision; and twenty-two North American—four from the southeastern United States, and eighteen from the western United States. The latter group constitutes a western geographical supplement of *Baptisia* whose western limits roughly coincide with the eastern limits of *Thermopsis.*

The problems were found to be largely bibliographical. The present treatment proposes no novelties, but has indicated two new combinations. It consists largely of a drastic reduction of a number of species. The four heretofore recognized southeastern species are reduced to three, and the eighteen western species have been reduced to seven species and five varieties. A key to the species, and brief descriptions with complete citations of synonyms and type or authentic specimens are given.

Relative uniformity, particularly within the western group, makes delimitation of entities difficult in many cases. As in *Baptisia,* flower structure furnishes little of value in this respect, and has therefore been given little emphasis. Fruit and vegetative characters seem to be the best bases for the separation of species, and have been stressed accordingly. Considerable doubt is felt by the author as to the validity of the two varieties of *T. rhombifolia: annulocarpa* and *arenosa,* for they

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are frequently difficult to distinguish from the species. Likewise, *T. pinetorum* and *T. divaricarpa* are separated on rather weak bases. However, a consideration of geographical distribution substantiates their individuality. All others seem fairly distinct.

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Abbreviations

MBG—Missouri Botanical Garden.
GH—Gray Herbarium.
ANSP—Academy of Natural Sciences of Philadelphia.
FM—Field Museum.
COL—University of Colorado.
WYO—University of Wyoming.
CAL—University of California.

Taxonomy

Thermopsis R. Br. in Ait. Hort. Kew. ed. 2, **3**: 3. 1811.
Thermia Nutt. Gen. N. Am. Pl. **1**: 282. 1818.
Scolobus Raf. in Jour. Phys. **89**: 259. 1819.
Drepilia Raf. New Fl. N. Am. **2**: 52. 1836 [1837].

Perennial herbs with woody rhizomes. Plant usually less than 1 m. high, more or less pubescent throughout. Stem slender or stout, simply branched, branches erect or divaricate. Stipules conspicuous, persistent, frequently foliaceous, ovate-cordate to lanceolate-acuminate, 1–5 cm. long. Petioles 1–4 cm. long. Leaves trifoliolately compound, leaflets linear, elliptic, oblanceolate, or obovate, 3–8 cm. long. Flowers racemose, racemes terminal or axillary, compact or lax, few- to many-flowered. Floral bracts conspicuous, semi-persistent, ovate-cordate to lanceolate, 0.6–1.2 cm. long. Pedicels 1–3 cm. long. Calyx-tube campanulate, bilabiate, upper lip truncate to emar-

ginate, lobes of the lower lip deltoid to lanceolate, usually one-half the length of the tube. Corolla papilionaceous, pale through deep yellow, 1–1.5 cm. in length. Legume sessile or very short-stipitate, usually linear, occasionally elliptic, not inflated, occasionally lomentaceous, straight, recurved, or annular, ascending or divaricate, 5–10 cm. long.

Distribution: North America: southeastern and western United States. Asia.

KEY TO THE SPECIES

1a. Plants of the southeastern United States
  1b. Stipules foliaceous.....*1. T. caroliniana*
  2b. Stipules not foliaceous
    1c. Leaflets 2–4 cm. long.....*2. T. mollis*
    2c. Leaflets 5–7 cm. long.....*3. T. fraxinifolia*
2a. Plants of the western United States
  1b. Pods divaricate
    1c. Pods more or less recurved
      1d. Plants from North Dakota and Saskatchewan, south to Nebraska and Colorado
        1e. Plant sparsely appressed-pubescent.....*4. T. rhombifolia*
        2e. Plant densely silvery-pubescent....*5. T. rhombifolia* var. *annulocarpa*
        3e. Plant glabrate.....*6. T. rhombifolia* var. *arenosa*
      2d. Plants from Oregon and California
        1e. Plant sparingly strigose.....*13. T. gracilis*
        2e. Plant silvery-canescent.....*14. T. gracilis* var. *argentata*
        3e. Plant glabrate.....*15. T. gracilis* var. *venosa*
    2c. Pods virtually straight.....*7. T. divaricarpa*
  2b. Pods ascending
    1c. Pods glabrate.....*8. T. pinetorum*
    2c. Pods conspicuously pubescent
      1d. Leaflets linear.....*9. T. montana*
      2d. Leaflets obovate to broadly elliptic
        1f. Plant softly pubescent to glabrate.....*10. T. ovata*
        2f. Plant woolly-tomentose.....*11. T. macrophylla*
        3f. Plant silvery-silky canescent.....*12. T. macrophylla* var. *velutina*

1. T. caroliniana M. A. Curt. in Am. Jour. Sci. I. **44**: 80. 1843.

Plant 0.8–1 m. high; stem stout, sparingly pubescent to glabrate, erect, simply branched; stipules foliaceous, clasping, broadly ovate, 4–5 cm. long, 2–3 cm. broad; petioles 4–6 cm. long; leaflets obovate, glaucous and finely appressed-pubescent below, 5–8 cm. long, 2.5–4 cm. broad; raceme compact, erect, 1.5–2.5 dm. long; bracts ovate, 3–6 mm. long, caducous; pedi-

cels 2–4 mm. long; calyx-tube silky villous; legume firm, densely villous, straight, appressed to rachis, 4–5 cm. long.

Distribution: North Carolina to Georgia and Tennessee.

CITATION OF SPECIMENS:

NORTH CAROLINA: open woods near Highlands, Macon Co., July 3, 1897, *Biltmore Herb. 133b* (MBG); Highlands, 1889, *Boynton* (MBG); in montibus Carolinae et Georgiae, 1842, *Buckley* (MBG); Haywood Co., *Curtis* (GH, probable TYPE).

GEORGIA: banks of Tallulah River below Berton P. O., Aug. 18–20, 1893, *Small* (MBG).

TENNESSEE: hills around Nashville, *Gattinger, Curt. 700* (MBG); Harpeth hills near Nashville, 1875, *Gattinger* (MBG).

2. T. mollis (Michx.) M. A. Curt. ex A. Gray in Mem. Am. Acad. N. S. **3**: 47, *fig. 9*. 1848.

Podalyria mollis Michx. Fl. Bor. Am. **1**: 264. 1803.

Baptisia mollis (Michx.) DC. Prodr. **2**: 100. 1825.

Baptisia Hugeri Small in Bull. Torr. Bot. Club **25**: 139. 1898.

Thermopsis Hugeri Small, Fl. Southeast. U. S. 596, 1331. 1903.

Plant 3–5 cm. high, softly pubescent throughout; stem diffusely branched, branches slender; stipules varying from ovate to lanceolate, 0.4–1.2 cm. long; petioles 0.5–1.5 cm. long; leaflets broadly elliptic, occasionally ovate, apex acuminate, tawny-pubescent along the veins of the lower surface, 2–4 cm. long, 1–2 cm. broad; racemes compact, flexuous, 0.5–1.5 dm. long; bracts lanceolate, semi-persistent, 0.8–1 cm. long; pedicels 0.5–1 cm. long; calyx minutely pubescent; pods firm, elliptic, appressed-pubescent, divaricate, 3–4 cm. long.

Distribution: Virginia to North Carolina and Georgia.

CITATION OF SPECIMENS:

VIRGINIA: dry ridges near Hampden Sidney College, Prince Edward Co., June 1884, *Blair* (MBG).

NORTH CAROLINA: no definite locality, *Curtis* (ANSP,TYPE); no definite locality, *Curtis mis. 1842* (MBG); Statesville, *Hyams* (MBG); no definite locality, *Schweinitz* (ANSP).

GEORGIA: Cornelia, May 1, 1897, *Huger* (MBG,COTYPE of *T. Hugeri* Small).

3. T. fraxinifolia (Nutt.) M. A. Curt. in Am. Jour. Sci. I. **44**: 81. 1843.

Baptisia mollis (Michx.) Nutt. Gen. N. Am. Pl. **1**: 281. 1818.

Baptisia fraxinifolia Nutt. Mss. ex Torr. & Gray, Fl. N. Am. **1**: 387. 1840.

Plant 4–6 dm. high, lightly appressed-pubescent throughout; stem occasionally glabrate, branched, branches geniculate, slender; stipules lanceolate, 0.8–1 cm. long, persistent; petioles 1.5–2.5 cm. long; leaflets obovate-elliptic, lower surface pubescent along the veins, 5–7 cm. long, 2–3 cm. broad; racemes loose, flexuous, 1–2 dm. long; bracts ovate-cordate, 0.5–1.5 cm. long, semi-persistent; pedicels 0.5–1.2 cm. long; calyx glabrate; pods linear, delicate, minutely pubescent, recurved, divaricate, 7–8 cm. long.

Distribution: North Carolina to Georgia and Tennessee.

Citation of Specimens:

North Carolina: southeastern North Carolina, *Ashe* (MBG); Pilot Mtn., July 1895, *Ashe* (MBG); rich, shady slopes, Biltmore, May 1 & 10, 1896, *Biltmore Herb. 1025* (MBG); in montibus Carolinae et Georgiae, 1842, *Buckley* (MBG); no definite locality, 1842, *Curtis* (MBG); in vicinity of Table Rock Mtn., Aug. 2, 1890, *Heller* (MBG); Asheville, June 1925, *Kraus* (MBG); no definite locality, *Nuttall* (ANSP,type of *B. fraxinifolia* Nutt.); dry soil, Black Mtns., Sept. 4, 1931, *Sharp* (MBG).

Tennessee: Lookout Mtn., May 1869, *Canby* (MBG).

4. T. rhombifolia Nutt. ex Richards. in Frankl. Narr. First Journ. App. 737. 1823.

Cytisus rhombifolius Nutt. in Fras. Cat. 1813; Pursh, Fl. Am. Sept. Suppl. **2**: 741. 1814.

Thermia rhombifolia Nutt. Gen. N. Am. Pl. **1**: 282. 1818.

Plant 2–4 dm. high, appressed-pubescent throughout; stem slender, firm, geniculate, sparingly branched; stipules ovate-cordate, 0.5–1 cm. long; petioles 0.5–1 cm. long; leaflets obovate-cuneate to elliptic or oblanceolate, 2–3 cm. long, 1–2 cm. broad; racemes loose, usually less than 1 dm. long; bracts lanceolate, 5–7 mm. long, usually caducous; calyx-tube usually somewhat villous; pods silky villous, lomentaceous, recurved to annular, divaricate, 4–6 cm. long.

Distribution: North Dakota and Alberta, south to Nebraska and Colorado.

Citation of Specimens:

North Dakota: clay soil near top of butte, Medora, June 1, 1912, *Bergman* (MBG); sandy bluffs, Bismarck, May 1891, *Lanterman* (MBG).

SOUTH DAKOTA: hilltop near Lead, June 24, 1928, *Lee* (MBG); eroded banks and ravines, Bad Lands, near Wall, Pennington Co., June 15, 1929, *Palmer 37290* (MBG); open rocky woods near Lead, Lawrence Co., June 17, 1929; *Palmer 37352* (MBG); foothills, Black Hills, Rapid City, June 30, 1909, *White* (MBG).

NEBRASKA: sandy banks of Missouri, Fort Pierre, June 1853, *Hayden* (MBG); river bottoms above Council Bluffs, June 10, 1853, *Hayden* (MBG); Frankl. Exp., *Hooker* (ANSP); common in dry washes and slopes, Sioux Co., May-June 1927, *Kramer 52* (MBG); no definite locality, *Nuttall* (ANSP,TYPE).

SASKATCHEWAN: open hillside, Lupton, May 11, *Clokey 1800* (MBG); Estevan, June 22, 1907, *Cowles 18* (MBG).

ALBERTA: prairie and stubble, Craigmyle district, May 25, 1922, *Brinkman* (MBG); dry gravelly soil, Red Deer Valley, vicinity of Rosedale, May 10, 1915, *Moodie 860* (MBG).

MONTANA: Custer, 1890, *Blankinship 22* (MBG); Westby, June 17, 1927, *Larsen 20* (MBG).

WYOMING: disintegrated rocks, Ridge, Albany Co., June 18, 1901, *Goodding 38* (MBG); slate slides, Alcova, Natrona Co., June 29, 1901, *Goodding 151* (MBG); Table Mtn., June 2, 1894, *Nelson 121 & 122* (MBG); open stony ridges, Arlington, July 10, 1924, *Nelson 10145* (MBG); shale soil 8 mi. northwest of Hulett, Crook Co., June 6, 1935, *Ownbey 646* (MBG); dry soil, Telephone Canyon, Laramie Hills, Albany Co., May 30, 1936, *Ownbey 1027* (MBG); dry slopes, Bates Hole, June 20, 1926, *Payson & Payson 4760* (MBG); dry hillsides 6 mi. west of Keycee, Johnson Co., April 27, 1934, *Rollins 413* (MBG); plains at base of Cheyenne Mtn., May 4, 1891, *Smith* (MBG); dry plains, Carbon Co., May 27, 1932, *Williams 397* (MBG); in gravel, Telephone Canyon, east of Laramie, Albany Co., June 18, 1935, *Williams 2218* (MBG); pine forest, South Fork of Clear Creek, Johnson Co., June 26, 1936, *Williams & Williams 3117a* (MBG).

COLORADO: Canyon City, May 1871, *Brandegee 19 & 22* (MBG); infrequent on sandstone rock 5 mi. east of Boulder, April 30, 1921, *Hanson C41* (MBG); Platteville, April 17, 1908, *Johnston 462* (MBG); Fern Lake Trail, Estes Park, June 20, 1929, *Mathias 408* (MBG); Manitou, May 15, 1892, *Mulford* (MBG); on plains 2 mi. north of Simla, Elbert Co., June 23, 1937, *Ownbey 1296* (MBG); Mt. Pass, July 1, 1886, *Trelease* (MBG); Gregory Cañon, Boulder Co., May 21, 1912, *Vestal 368* (MBG).

5. T. rhombifolia var. **annulocarpa** (Nels.) L. Wms. in Ann. Mo. Bot. Gard. **23**: 450. 1936.

T. annulocarpa A. Nels. in Bull. Torr. Bot. Club **26**: 239. 1899.

As the species except somewhat more densely silvery-pubescent throughout, and pods usually completely annular.

Distribution: Wyoming.

CITATION OF SPECIMENS:

WYOMING: along roadsides, Bills' Flat, Big Horn Co., July 25, 1901, *Goodding 353* (MBG); among rocks on naked slopes near summits of Ferris Mtns., July 25, 1898, *Nelson 4971* (WYO,TYPE of *T. annulocarpa* Nels.); in clay and sandy ravines,

Fort Steele, Carbon Co., June 16, 1900, *Nelson 7252* (MBG); barren slopes above snow bank, Bates Hole, June 20, 1926, *Payson & Payson 4799* (MBG); in pine forest on South Fork of Clear Creek, Johnson Co., June 26, 1936, *Williams & Williams 3117* (MBG).

6. T. rhombifolia var. **arenosa** (Nels.) Larisey, comb. nov.

T. arenosa A. Nels. in Bot. Gaz. **25**: 276, *pl. 18. fig. 4.* 1898.

As the species except somewhat larger in general habit and tending to become glabrate.

Distribution: Wyoming.

Citation of Specimens:

Wyoming: Laramie Hills, July 17, 1897, *Nelson 3182a* (WYO,type of *T. arenosa* Nels.); sandy washes, Laramie Hills, June 1906, *Nelson* (MBG); sandy soil, foot of Telephone Canyon, Laramie Mtns., Albany Co., June 8, 1933, *Porter 1291 & 1329* (MBG).

7. T. divaricarpa A. Nels. in Bot. Gaz. **25**: 275. 1898.

Plant 4–6 dm. high, softly pubescent to glabrate throughout; stem slender, firm, branched; stipules ovate-lanceolate, 1.5–2.5 cm. long; petioles 1–2 cm. long; leaflets oblanceolate-elliptic, 3–4 cm. long, 1–2 cm. broad; racemes loose, erect, 1–2 dm. long; bracts ovate-lanceolate, 8–10 mm. long, usually caducous; pedicels 4–6 cm. long; calyx-tube softly pubescent to glabrate; pods lomentaceous, softly pubescent to glabrate, usually straight, or only slightly recurved, divaricate, 4–7 cm. long.

Distribution: Wyoming and Colorado.

Citation of Specimens:

Wyoming: rocky bars near Little Laramie River, Albany Co., June 15, 1901, *Goodding 10* (MBG); stream bank near Centennial, Albany Co., June 24, 1929, *Goodman 632* (MBG); Telephone Canyon, Pole Creek, Medicine Bow Mtns., July 16, 1925, *Hanna 96* (MBG); J. Johnson's ranch, Aug. 8, 1897, *Nelson 3903* (WYO, type); along banks, Sand Creek, Albany Co., June 2, 1900, *Nelson 7031* (MBG); creek banks, Mandel, Albany Co., July 24, 1903, *Nelson 1910* (MBG); edge of thickets, Fish Creek, Albany Co., July 4, 1917, *Nelson 9784* (MBG); moist creek bottom, Crow Creek, Laramie Hills, Albany Co., July 11, 1935, *Rollins 977* (MBG); dry hillside among sage-brush near Crow Creek, Laramie Mtns., Albany Co., June 20, 1935, *Williams 2236* (MBG).

Colorado: Breckenridge, Rocky Mtns., 1871, *Brandegee 279* (MBG); Brookvale, Clear Creek Co., June 11, 1918, *Churchill* (MBG); Ward, July 7, 1906, *Daniels 109* (MBG); Clear Creek Valley, Idaho Springs, Aug. 2, 1874, *Engelmann* (MBG); slopes, Anita Peak, Routt Co., Aug. 3, 1903, *Goodding 1779* (MBG); common 10 mi. west of Boulder on dry slopes near Boulder Falls, July 5, 1920, *Hanson c375* (MBG); Boulder, Aug. 21, 1884, *Letterman* (MBG); near Breckenridge, Summit Co., Aug. 1901, *Mackenzie 256* (MBG); near houses, Wagon Wheel Gap Exp. Sta-

tion, Mineral Co., June 3, 1900, *Murdoch 4524* (MBG); moist mountain meadows, Trails' End, Aug. 26, 1923, *Nelson 10019* (MBG); wet creek banks, Salida, May 18, 1925, *Nelson 10495* (MBG); stream banks, Idaho Springs, Sept. 3, 1928, *Nelson 10948* (MBG); dry slopes, Tolland, July 4, 1923, *Overholts, Roberts & Shope 140* (MBG); Idaho Springs, July 20, 1884, *Smith* (ANSP); Lyons, May 23, 1892, *Smith* (MBG); Manitou Park, July 7, 1891, *Trelease* (MBG); Golden, June 30, 1933, *Zobel* (MBG).

8. T. pinetorum Greene, Pittonia **4**: 138. 1900.

T. pauciflora Thornber ined.

Plant 3–4 dm. high, sparsely pubescent to glabrate; stem slender, firm, branched; stipules broadly lanceolate, 1.5–3.5 cm. long, lowermost frequently longer than the leaflets; petioles 1.5–3 cm. long; leaflets broadly oblanceolate to elliptic, glabrous above, sparsely appressed-pubescent below, 4–5 cm. long, 1.5–3 cm. broad; racemes loose, few-flowered, usually less than 1 dm. long; bracts ovate-cordate, semi-persistent; pedicels 5–10 mm. long; calyx silky-villous; pods straight, ascending, glabrate, 4–6 cm. long.

Distribution: Colorado to New Mexico, Utah, and Arizona.

CITATION OF SPECIMENS:

COLORADO: Flat Top Mtn., Estes Park, Aug. 14, 1933, *Allen 3* (MBG); Larimer Co., May 10, 1895, *Baker* (MBG); Los Pinos (Bayfield), May 23, 1899, *Baker 442* (fl.) (MBG,WYO,part of TYPE, CAL,ND); Marshall Pass, July 19, 1901, *Baker 485* (fr.) (MBG,FM,WYO,CAL,ND,part of TYPE); Chicken Creek, La Plata Mtns., July 6, 1898, *Baker, Earle & Tracy 350* (MBG); dry soil, Mount Vernon Cañon, Jefferson Co., June 20, 1921, *Bethel & Clokey 4186* (MBG); Estes Park, Aug. 14, 1933, *Burton* (MBG); meadow, Fremont Ranger Station, Rio Grande Nat. Forest, Mineral Co., May 27, 1911, *Murdoch 4519* (MBG); dry hillsides, Tolland, June 25, 1913, *Overholts* (MBG); Ward, 1908, *Pace 296* (MBG); aspen groves, Uncompahgre Divide, W. Montrose Co., July 3, 1924, *Payson & Payson 3898* (MBG); Denver, May 23, 1892, *Smith* (MBG).

NEW MEXICO: Solitario, vicinity of Las Vegas, July 9, 1926, *Arséne 17863* (MBG); canyon, vicinity of Santa Fe, July 31, 1926, *Arséne & Benedict 16925* (MBG); Balsam Park, Sandia Mtns., May-June 1915, *Ellis 40* (MBG); base of mountains in Santa Fe Creek Valley 5 mi. above town, May 1847, *Fendler 185* (MBG); along Pecos River 8 mi. east of Glorietta, San Miguel Co., June 9, 1897, *Heller & Heller 3681* (MBG); in Mogollon Mtns. near west fork of Gila River, Socorro Co., Aug. 23, 1903, *Metcalfe 593* (MBG).

ARIZONA: Chiricahua Mtns., Barfoot Park, north slope, Aug. 19, 1907, *Blumer 1590* (MBG); Matzatzal Mtns., Gila Co., *Collom 286* (MBG); Chiricahua Mtns., Rustlers' Park, June 18-19, 1930, *Goodman & Hitchcock 1162* (MBG); yellow pines, Flagstaff, Aug. 4, 1922, *Hanson A81* (MBG); Baker's Butte, June 2, 1890, *Jones* (MBG); Flagstaff, June 1883, *Rusby 551* (MBG); stony creek banks, Flagstaff, April 21, 1925, *Nelson 10200* (MBG); Oak Creek Canyon, May 24, 1935, *Nelson & Nelson 2108* (MBG).

UTAH: gravel, Silver Reef, May 4, 1894, *Jones 5158* (MBG); Elk Ridge, west ridge, San Juan Co., June 23, 1932, *Maguire & Redd 1918* (MBG); near timberline, La Sal Mtns., Grand Co., July 22, 1924, *Payson & Payson 3957* (MBG); moist shaded locations in canyon, Geyser Basin, San Juan Co., July 19, 1912, *Walker 315* (MBG).

9. T. montana Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 388. 1840.

T. fabacea (Pall.) DC. ex Hooker, Fl. Bor. Am. **1**: 128. 1838.

T. angustata Greene, Pl. Baker. **3**: 34. 1901.

T. stricta Greene, Pl. Baker. **3**: 34. 1901.

Plant 6–8 dm. high, slightly villous to glabrate in parts; stem stout, succulent, sparingly branched, branches ascending; stipules linear-lanceolate, ascending, 2–3 cm. long; petioles 1–3 cm. long; leaves ascending, leaflets linear to linear-lanceolate, converging, 3–8 cm. long; racemes compact, erect, 1–2 dm. long, bracts lanceolate, 0.8–1.2 cm. long, semi-persistent; pedicels 4–6 mm. long; calyx-tube silky villous; pods villous, straight, erect, closely appressed to rachis, 5–7 cm. long.

Distribution: Montana south to Colorado, west to Oregon and Nevada.

CITATION OF SPECIMENS:

MONTANA: frequent, low ground, Bozeman, June 28, 1899, *Blankinship* (MBG); low ground, Belgrade, June 2, 1906, *Blankinship 681* (MBG); Sheridan, June 1895, *Fitch* (MBG); East Gallatin Swamps, July 24, 1896, *Flodman 614* (MBG); meadow, Armsted, Beaverhead Co., June 20, 1920, *Payson & Payson 1734* (MBG).

WYOMING: river bottoms, Henry's Fork, Uintah Mtns., June 26, 1902, *Goodding 1192* (MBG); meadows, Slater, Colo.-Wyo. line, Carbon Co., July 31, 1903, *Goodding 1733* (MBG); moist, grassy bottom-land along Ham's Fork, Granger, June 11, 1931, *Hanna 735* (MBG); moist peat in meadow of grasses and sedges, Lonetree, Uintah Co., June 21, 1934, *Harrison & Larsen 7915* (MBG); moist grassy places, Fort Bridger, June 27, 1926, *Heller 13949* (MBG); among willows and cottonwoods, Evanston, Uintah Co., June 14, 1900, *Nelson 7216* (MBG); wet river lands, Baggs, July 4, 1926, *Nelson 10720* (MBG); Laramie, June 28, 1899, *Pammel 57* (MBG); in wet swales, hills east of Lyman, June 8, 1932, *Rollins 147* (MBG).

COLORADO: Fort Collins, May 15, 1896, *Baker* (MBG); Sapinero, June 19, 1901, *Baker 173* (fl.) (MBG,WYO,CAL,ND,part of TYPE of *T. stricta* Greene); Gunnison, July 24, 1901, *Baker 604* (fr.) (MBG,WYO,CAL,ND,part of TYPE of *T. stricta* Greene); clearing, Everett Lake, Lake Co., July 5, 1919, *Clokey 3588* (MBG); no definite locality, 1871, *Greene* (MBG); low wet grassy banks of White River, 2 mi. east of Meeker, Rio Blanco Co., Aug. 18, 1935, *Maguire & Piranian 12844* (MBG); rocky mountain slopes between Corona Station and Tolland, Gilpin Co., June 24, 1926, *Palmer 31258* (MBG); river bottom, Naturita, May 20, 1914, *Payson 330* (MBG); Canyon City, 1888, *Wislizenus 843* (MBG).

IDAHO: Bear Lake, Aug. 8, 1898, *Mulford 280* (MBG); wet sandy banks, Devil Creek, Owyhee Co., June 27, 1912, *Nelson & Macbride 1742* (MBG).

UTAH: Kimballs, vicinity of Salt Lake City, June 3, 1908, *Clemens* (MBG); north slope of Abajo Mtns., July 1-2, 1930, *Goodman & Hitchcock 1389* (MBG); damp meadow near Bear River, Summit Co., Aug. 10, 1931, *Greenman & Greenman 4620* (MBG); Fish Lake, Aug. 10, 1927, *Harris c27572* (MBG); deep shade of aspen grove, Ashley Forest, Duchesne Co., June 13, 1934, *Harrison & Larsen 7623* (MBG); dry rocky hillside, Carter Creek, Daggett Co., June 19, 1934, *Harrison & Larsen 7883* (MBG); grassy bank of Sheep Creek at Manila Rd., Daggett Co., July 11, 1933, *Hermann 4728* (MBG); edge of aspens in wet meadow, Goodman ranch, Bear River Valley, Summit Co., Aug. 9, 1933, *Hermann 5764* (MBG); Heyrum, May 15, 1898, *Mulford 44* (MBG); in woods, shady banks of Bear River, Uintah Mtns., July 26-Aug. 7, 1902, *Pammel & Blackwood 4113* (MBG); Fish Lake, July 9, 1875, *Ward 344* (MBG); Sheep Creek Canyon, vicinity of Flaming Gorge, Daggett Co., May 29, 1932, *Williams 432* (MBG).

NEVADA: vicinity of Current, Nye Co., May 1916, *Bentley* (MBG); Star Valley, foothills of Ruby Mtns., July 20, 1896, *Greene* (ND,TYPE of *T. angustata* Greene); Star Canyon southeast of Deeth, Elko Co., July 10, 1912, *Heller 10575* (MBG); Wells, June 22, 1930, *Jones 25461* (MBG); Eureka, Eureka Co., July 2, 1904, *Kennedy 838* (MBG); North Fork, Humboldt River, Elko Co., Aug. 6, 1913, *Kennedy 4474* (MBG); sandy river banks, Mountain City, Aug. 13, 1912, *Nelson & Macbride 2200* (MBG); Camp Hallick, 1876, *Palmer* (MBG).

OREGON: moist sunny bottoms of South Fork, John Day, Prairie City, Grant Co., June 5 & 17, 1925, *Henderson 5384* (MBG); Canyon City, May 20, 1885, *Howell* (MBG); dry woods, summit of Blue Mtns., near Meacham, Umatilla Co., May 10, 1928, *Gale 254* (MBG).

EXACT LOCALITY UNKNOWN: Rocky Mountains, *Nuttall* (ANSP,TYPE).

10. T. ovata (Rob.) Rydb. in Bull. Torr. Bot. Club **40**: 43. 1913.

T. montana subsp. *ovata* Rob. in Contr. U. S. Nat. Herb. **2**: 349. 1906.

T. xylorrhiza Nels. in Bot. Gaz. **52**: 265. 1911.

Plant 6–8 dm. high, softly pubescent to glabrate throughout; stem stout, succulent, sparingly branched; stipules foliaceous, obovate to ovate-cordate, 2–4 cm. long; petioles 2–4 cm. long; leaflets obovate to broadly elliptic, 6–8 cm. long, 2–4 cm. broad; racemes loose, 2–3.5 dm. long; bracts foliaceous, ovate-cordate, 1–1.5 cm. long; calyx-tube villous; pods silky-villous, ascending, usually but not always closely appressed to the rachis, 5–7 cm. long.

Distribution: Wyoming west to Washington, and Oregon.

CITATION OF SPECIMENS:

WYOMING: Evanston, July 28, 1897, *Nelson 3863* (MBG).

IDAHO: forest, Nez Perces Co., Aug. 1896, *Brown* (MBG); grassy ditch, arid transition ½ mi. southeast of Lapwai, Nez Perces Co., May 3, 1935, *Constance, Clark, Dillon, Machlis & Rollins* (MBG); sandy bank of Middle Fork Clearwater River, at mouth of Squaw Creek, 3 mi. below Lowell, Canadian Zone, Nez Perces National Forest, Idaho Co., May 30, 1936, *Constance & Rollins 1621* (MBG); Latah Co., 1896, *Elmer 363* (MBG); Cedar Mtns., Latah Co., July 1899, *Elmer 1535* (MBG); near Lewiston, Nez Perces Co., May 7, 1896, *Heller & Heller 3035* (MBG); Indian Valley, July 13, 1899, *Jones 6222* (MBG); shady loam slopes, Falks' Store, Canyon Co., May 24, 1910, *Macbride 99* (MBG,WYO,CAL,TYPE of *T. xylorrhiza* Nels.); moist loamy flats, Falks' Store, Canyon Co., May 10, 1911, *Macbride 800* (MBG); natural meadow lands, Squaw Creek (Sweet), May 9, 1911, *Macbride 845* (MBG); Latah Co., June 16, 1893 (June 21, 1894), *Piper 1489* (MBG,FM,TYPE); sandy shores, valley of Hatwai Creek, Nez Perces Co., April 28, 1892, *Sandberg, MacDougal & Heller 68* (MBG).

WASHINGTON: light shade of lodgepole forest 4 mi. north of Table Rock, Blue Mtns., Columbia Co., July 20, 1935, *Constance, Clarke, Staats & Van Vleet* (MBG); Oxford Prairie, Chehalis Co., June 12, 1897, *Lamb 1197* (MBG,ANSP,FM,CAL); roadsides north of Hoquiam, Grays Harbor Co., May 9, 1931, *Thompson 6238* (MBG); roadside near Humptulips, Grays Harbor Co., July 10, 1931, *Thompson 7342* (MBG).

OREGON: moist situations, eastern Ore., June 24, 1899, *Cusick 2203* (MBG); Summit, June 1, 1892, *Mulford* (MBG); open woods near summit of Blue Mtn., between Pendleton and La Grande, June 14, 1928, *Thompson 4723* (MBG); damp field south of Imbler, Union Co., June 15, 1928, *Thompson 4830a* (MBG); wooded slopes of Sexton Mtn., Josephine Co., April 9, 1934, *Thompson 10209* (MBG).

11. T. macrophylla Hook. & Arn. Bot. Beech. Voy. 329. 1840; Torr. & Gray, Fl. N. Am. 1: 388. 1840; Torr. in Pac. Rail. Rept. 4: 81. 1856.

T. fabacea (Pall.) DC. ex Torr. Bot. Mex. Bound. Surv. 58. 1856.

T. californica S. Wats. in Proc. Am. Acad. 11: 126. 1876.

T. robusta Howell in Erythea 1: 109. 1893.

Plant 4–6 dm. high, woolly-tomentose throughout; stem stout, diffusely branched, branches ascending; stipules foliaceous, ovate-cordate, 2–3.5 cm. long; petioles 1.5–2.5 cm. long; leaflets obovate-cuneate to oblanceolate or occasionally elliptic, 4–7 cm. long, 3–4 cm. broad; racemes loose or compact, straight, erect, 1.5–2.5 dm. long; bracts ovate-cordate, 0.5–1 cm. long, semi-persistent; pedicels 4–6 mm. long; calyx appressed-pubescent; pods densely appressed-pubescent, erect, 6–8 cm. long.

Distribution: Oregon and upper California.

CITATION OF SPECIMENS:

OREGON: Coast Mtns., Curry Co., June 1884, *Howell 75* (GH); Coast Mtns., 40th parallel, June 8, 1884, *Howell* (FM).

CALIFORNIA: in moist grassy places in open hills, Crystal Springs Lake, San Mateo Co., May 1, 1902, *Baker 685* (MBG); Knoxville, Napa Co., May 8, 1903, *Baker 3081* (MBG); Pac. R.R. Exp., 1853–4, *Bigelow* (ANSP); dry hillsides, Coast Range, San Rafael, May 1865, *Bolander* (MBG); near Mendocino, Mendocino Co., May 1898, *Brown 732* (MBG); no definite locality, *Douglas* (GH, probable TYPE); Tassajara Hot Springs, Monterey Co., June 1901, *Elmer 3289* (MBG); Mount Hamilton, Santa Clara Co., June 1903, *Elmer 5023* (MBG); Marin Co., April 4, 1921, *Epling 5233* (MBG); no definite locality, 1846, *Fremont 149* (MBG); Lagunitas, Marin Co., April 28, 1918, *Grinnell* (MBG); Smith Creek, foot of Mt. Hamilton, Santa Clara Co., May 10, 1907, *Heller 8518* (MBG,ANSP,FM); damp soil in ditch along highway about 5 mi. south of Calistoga, Napa Co., April 12, 1924, *Heller 13837* (MBG); between Santa Rosa and Agua Caliente, Sonoma Co., April 22, 1902, *Heller & Brown 5343* (MBG); Mt. Tamalpais, April 10, 1906, *Hobson* (MBG); Napa Co., Mar. 1852, *Thurber 548* (MBG,FM); San Luis Obispo, May 9, 1882, *Jones 2660* (MBG).

12. T. macrophylla var. **velutina** (Greene) Larisey, comb. nov.

T. californica var. *velutina* Greene in Erythea **1**: 81. 1893.

T. velutina Greene in Erythea **3**: 19. 1895.

T. gracilis var. *velutina* Jepson, Man. Fl. Pl. Calif. 515. 1925.

As the species except somewhat stouter though smaller throughout, and with a more silvery-silky appressed pubescence.

Distribution: California.

CITATION OF SPECIMENS:

CALIFORNIA: open flat 1 mi. south of Lagunitas, April 20, 1930, *Bracelin 10* (MBG); Crystal Springs Lake, San Mateo Co., May 1903, *Elmer 4824* (MBG); Mount Hamilton, July 1891, *Greene 32762 & 3* (MBG,ND,TYPE of *T. velutina* Greene); Mount Hamilton, Santa Clara Co., May 31, 1907, *Heller 8606* (MBG, ANSP,FM); mountains, San Diego, Aug. 1879, *Orcutt 594* (MBG); Santa Cruz Mtns., 1888, *Parry* (MBG); warm slope, Cuyamaca Lake area, San Diego Co., May 18, 1935, *Purer 6616* (MBG).

13. T. gracilis Howell in Erythea **1**: 109. 1893.

Plant 4–8 dm. high, sparingly strigose throughout; stem erect, slender, branches spreading; stipules broadly ovate-cordate to lanceolate, 1–2 cm. long; petioles 2–3 cm. long; leaflets obovate to oblanceolate, 3.5–5.5 cm. long, 2–3 cm. broad; racemes loose, 1–1.5 dm. long; bracts broadly ovate, 0.7–1.2 cm.

long, semi-persistent; pedicels 0.5–1 cm. long; calyx silky villous; pods densely villous, recurved, divaricate, lomentaceous, 4–5 cm. long.

Distribution: Oregon.

CITATION OF SPECIMENS:

OREGON: summit of lower Siskiyou Mtns., July 3, 1902, *Cusick 2927* (MBG); Corvallis, May 1922, *Epling 5615* (MBG); Waldo, April 1892, *Howell* (CAL); Waldo, July 1894, *Howell 1495* (MBG,ANSP,CAL).

14. T. gracilis var. **argentata** (Greene) Jeps. Fl. Pl. Calif. 515. 1893.

T. argentata Greene in Erythea **3**: 18. 1899.

As the species except silvery-canescent throughout, and having somewhat longer stipules.

Distribution: California.

CITATION OF SPECIMENS:

CALIFORNIA: Modoc Co., 1893, *Baker* (ND,TYPE of *T. argentata* Greene); Forestdale, Modoc Co., Aug. 14, 1899, *Baker* (MBG,ANSP,WYO,CAL); near Egg Lake, Modoc Co., Aug. 1894, *Baker & Nutting* (CAL,WYO).

15. T. gracilis var. **venosa** (Eastw.) Jeps. Man. Fl. Pl. Calif. 515. 1925.

T. venosa Eastw. in Bull. Torr. Bot. Club **32**: 198. 1905.

As the species except glabrous and somewhat more delicate throughout, stipules more foliaceous, and leaflets more conspicuously veined.

Distribution: Oregon and California.

CITATION OF SPECIMENS:

OREGON: Grave Creek, May 14, 1889, *Hammond 74* (MBG); open woods on trail to Tennessee Pass 2 mi. from Kirby, April 20, 1926, *Henderson 5981* (MBG).

CALIFORNIA: Dunsmuir, Siskiyou Co., July 23, 1912, *Eastwood 1319* (MBG); Shasta Springs on road to McCloud, May 27, 1923, *Eastwood 11865* (MBG); between Lamoine & Williams ranch on state highway in yellow pine and oak belt, Shasta Co., June 19, 1919, *Heller 13250* (MBG); McCloud Fork, Shasta Co., April 24, 1913, *Smith 110* (MBG).

DOUBTFUL SPECIES

T. subglabra Henderson in Rhodora **32**: 26. 1930.

The type specimen of this species was not available; from the description it appears to be *T. gracilis* var. *venosa*.