

VARIETIES OF *GEUM CANADENSE*.

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As anyone who has critically examined any considerable series of specimens must be aware, *Geum canadense* Jacq. is a variable species. Rydberg (N. Am. Fl. xxii. pt. 5: 403 (1913)) has segregated two of its forms as species; but had he seen material from a wider range his conclusions might have been different. Far from being, as he states, confined to the prairie region, his *G. camporum*, or a plant answering in all respects to his description, is apparently the commonest form of the group as far east as central New York and, beyond that, occurs in considerable quantity in northern and eastern Maine, New Brunswick and Nova Scotia, in eastern Massachusetts and rarely at scattered stations elsewhere in New England. Two of the characters—the shape of the petals and the length of the upper internode of the style—which he uses to distinguish *G. camporum* from *G. canadense*, break down completely: indeed, so far as the latter is concerned, we have seen only one specimen, and that referable to what we here call var. *texanum*, in which the upper internode is short enough to fit the measurement, “scarcely 1 mm. long,” given by him for *G. canadense*. In all other characters *G. camporum* and *G. canadense* pass almost imperceptibly into each other: the former can hardly be kept up as a species by anyone who accepts the category of variety at all. *G. Meyerianum* Rydb. (*G. agrimonioides* C. A. Meyer) appears to be only an inconstant foliage form, its pinnate lower leaves occurring in indiscriminate combination with all other characters in the group, and to be unworthy of any recognition.

As understood by the writers, *G. canadense* exhibits six recognizable trends, which may be distinguished as follows:

- a. Upper internode of the style conspicuously, though sparsely, bearded with stiff white hairs; body of the carpel usually sparsely appressed-pubescent as well as hispid with long setae: outer surface of sepals, petioles and stems with at least a few long hairs, or the stems sometimes glabrate.
- b. Flowers and fruiting heads with 30–60 carpels; these, when mature, with mostly broadly ovate to obovate bodies 2.5–3 mm. long: peduncles (except for the glands, when present) typically, but by no means always, finely puberulent only, or with a few, scattered long hairs: leaves thin in texture; blades of the median cauline leaves 5–10 cm. long, rarely shorter, the terminal segment mostly acute.
- c.

- c. Outer surface of sepals and peduncles without glands. . . 1. *G. canadense*
- c. Outer surface of sepals and peduncles more or less densely beset with articulate gland-tipped trichomes. . . . 2. f. *glandulosum*
- b. Flowers and fruiting heads mostly with 60–160 carpels; leaves of thick texture. d.
- d. Stem low and slender, 3–4.5 dm. high; blades of the median leaves 4–5 cm. long, the terminal segment rather broadly rhombic-ovate and commonly obtusish; bodies of the 60–100 carpels broadly ovate, 2–3 mm. long. 3. var. *texanum*
- d. Stem stout and mostly over 4.5 dm. tall; blades of the median cauline leaves 6–12 cm. long; the terminal segment mostly acute; peduncle typically but by no means always, pubescent with comparatively long hairs¹; carpels 60–160; their bodies commonly narrowly obovate or cuneate, 3–4 mm. long. e.
- e. Outer surface of sepals and peduncles glandless. . . . 4. var. *camperum*
- e. Outer surface of sepals and peduncles with gland-tipped articulate trichomes. 5. f. *adenophorum*
- a. Upper internode of the style merely very shortly and inconspicuously hispidulous; body of the carpel hispid above, otherwise glabrous; peduncle usually with gland-tipped trichomes; outer surface of sepals, petioles and stem merely puberulent or the stem sometimes glabrate. 6. var. *Grimesii*

1. *GEUM CANADENSE* Jacq. Hort. Vind. ii. 82 (1773). *G. album* J. F. Gmel. Syst. Nat. ii. 861 (1791). *G. agrimonoides* C. A. Meyer, Ind. Sem. Hort. Petrop. xi. suppl. 29 (1846), not Pursh. *G. Meyerianum* Rydb. N. Am. Fl. xxii. pt. 5: 403 (1913).— Rich woods, wood-margins and thickets, New Brunswick to West Virginia, westward to Illinois and Minnesota. The following specimens, mostly fruiting, may be cited as representative. NOVA SCOTIA: Five-mile River, Hants Co., July 19, 1920, *Pease & Long*, no. 21,514. MAINE: Woodstock, Aug. 12, 1890, *Parlin*. NEW HAMPSHIRE: Alstead, July 28, 1899, *Fernald*, no. 99. VERMONT: Salisbury, July 14, 1908, *E. F. Williams*. MASSACHUSETTS: Huntington, Aug. 17–21, 1912, *B. L. Robinson*, nos. 716, 749. CONNECTICUT: Trumbull, July 18, 1892, *E. H. Eames*. NEW YORK: Fall Creek, Ithaca, Aug. 26, 1916, *A. J. Eames*, no. 6704. PENNSYLVANIA: On the Conestoga, Lancaster Co., Sept. 3, 1892, *Heller*. VIRGINIA: Middle Holston Valley, Smyth Co., July 4, 1892, *Small*. WISCONSIN: *Lapham*. MINNESOTA: Spring Grove, June 30, 1902, *Rosendahl*, no. 652.

2. Forma **glandulosum**, n. f., sepalis extus et pedunculis puberulis et trichomatibus articulatis glanduliferis plus minusve dense obsitis.—QUEBEC: woods, East Bolton, Brome Co., June 28, 1909, *Pease*, no. 11,980; vicinity of Montmorency Falls, July 5, 1905, *John Macoun*, no. 67,145a, TYPE in hb. Gray. MAINE: moist thicket, Vassalboro, July 3, 1902, *E. B. Chamberlain*; Molly Ockett Mt., Woodstock, Aug. 12, 1890, *Parlin*; Farmington, June, 1892, *C. H. Knowlton*. NEW HAMPSHIRE: shaded roadside in village, Colebrook, July 18, 1917, *Fernald & Pease*, no. 16,601; roadside thicket, Randolph, July 12, 1916, *Pease*, no. 16,719; Hanover, July 6, 1910, *E. F. Williams*. VERMONT: Manchester, June 25, 1898, *M. A. Day*, no. 380.

¹ But never hirsute as in *G. virginianum*.

3. Var. **texanum**, n. var., planta humilis gracilisque; caulibus 3–4.5 dm. altis, plus minusve villosis vel glabratiss; foliorum caulinarum medianorum laminis 4–5 cm. longis, segmento terminali rhombicali-ovato plerumque obtusisculo; sepalis extus et puberulis et sparse villosis pilis longis; carpellis 60–100, 2–3 mm. longis (stylo excluso), hispidis et pubescentibus pilis brevibus subappressis.—LOUISIANA: vicinity of Alexandria, June 8, 1899, *C. C. Bull*, no. 595. OKLAHOMA: in woods near Idabel, McCurtain Co., May 20, 1916, *H. M. Houghton*, no. 3686. TEXAS: moist soil, Onion Creek near Austin, May 17, 1918, *M. S. Young*, no. 161, TYPE in hb. Gray; Houston, April, 1840, *Lindheimer*.

4. Var. **camporum** (Rydb.), n. comb. *G. camporum* Rydb. N. Am. Fl. xxii. pt. 5: 403 (1913).—Fields, meadows, roadsides and waste places, or, in the West, more often in woods: New Brunswick, Nova Scotia, eastern and northern Maine, eastern Massachusetts and rarely elsewhere in New England; central New York to western North Carolina and Alabama, west to North Dakota and Oklahoma. The following specimens, mostly fruiting, may be cited as representative. NOVA SCOTIA: Port Mouton, Queens Co., Aug. 18, 1920, *Bissell & Graves*, no. 21,516; Weymouth, Digby Co., Aug. 21, 1920, *Fernald et al.*, no. 21,517. MASSACHUSETTS: Brewster, Barnstable Co., Sept. 7, 1918, *Fernald & Long*, no. 16,879. NEW YORK: East Utica, July, 1899, *Haberer*, no. 1814. NORTH CAROLINA: Biltmore, July 7 and Aug. 9, 1897, *Biltmore Herb*, no. 457a. ALABAMA: Lomax, June 18, 1898, *Earle & Baker*. MISSOURI: Jackson Co., July 11, 1893, *Bush* no. 92; southeast of Pacific, Aug. 9, 1910, *Sherff*, no. 899. OKLAHOMA: near Guthrie, Logan Co., June 14, 1914, *G. W. Stevens*, no. 3285; near Alva, Woods Co., July 11, 1913, *Stevens*, no. 1678.

5. Var. **CAMPORUM**, forma **adenophorum**, n. f., a praecedente differt sepalis extus sparse glandulosis, pedunculis pubescentibus trichomatibus articulatis glanduliferis plus minusve dense obsitis.—MASSACHUSETTS: border of woods, Sherborn, July 8, 1911, *M. L. Loomis*, no. 207. MICHIGAN: edge of hardwood, Turin, Marquette Co., July 8, 1901, *Bronson Barlow*. ILLINOIS: rich woods, Peoria, July, 1904, *F. E. McDonald*, TYPE in hb. Gray; Ottawa, *J. W. Hurtt*.

6. Var. **Grimesii**, n. var., caule petiolisque puberulis vel glabratiss; foliis crassiusculis; pedunculis plerumque trichomatibus articulatis glandulosis obsitis; sepalis extus puberulis, sine pilis longis; stylorum internodiis superioribus inconspicue et brevissime hispidulis; carpellis 75–120, 3–4 mm. longis (stylo excluso) ad rostri basin sparse hispidis sine pubescentia adpressa.—PENNSYLVANIA: Chester Co., 1858–1864, *S. P. Sharples*. DISTRICT OF COLUMBIA: moist grassy places, Washington, June 18, 1896, *E. S. Steele*. VIRGINIA: Belfield, Greenville Co., June 19, 1893, *Heller*, no. 1004; rich wooded flood-plain near Williamsburg, May 23, 1921, *Grimes* no. 3605, TYPE in hb. Gray; wooded flood-plain, Williamsburg, May 17, 1921, *Grimes*, no. 3583. NORTH

CAROLINA: Asheville, "June", *W. W. Ashe*. INDIANA: flat woods along Muscatatuck River near Weston, Jennings Co., July 14, 1919, *Deam*, no. 28,085 (two sheets); flat woods of the Hennesley bottoms near Huntingsburg, Dubois Co., July 18, 1919, *Deam*, no. 28,321 (two sheets).

As already noted in the key, one of the distinguishing points of var. *texanum* is its tendency to obtuse leaf-segments. In the other three varieties also there is discernible, in addition to the characters above stated, a somewhat vague and far from constant tendency to develop distinctive types of foliage. In var. *camporum* the leaves are not only of heavier texture than in the typical form, but their segments tend to be broader. In var. *Grimesii* this tendency is carried so far that, in the majority of specimens seen, the upper stem-leaves are neither three-parted nor, as often in the other varieties, reduced to merely dentate ovate-lanceolate or ovate-rhombic blades distinctly longer than broad; they are nearly or quite as broad as long and shallowly three- to several-lobed, in the most extreme form closely simulating leaves of *Crataegus rotundifolia*. And the segments of all the leaves tend to be broader even than in var. *camporum*. Forma *glandulosum* and f. *adenophorum* differ from the typical form and from var. *camporum* respectively only in the presence of gland-tipped trichomes. Plants with the lower leaves pinnate (*G. Meyerianum*) occur in the typical form and in vars. *camporum* and *Grimesii*. The original *G. agrimonoides* C. A. Meyer, on which *G. Meyerianum* Rydb. is based, appears from the description to belong with typical *G. canadense*.

GRAY HERBARIUM.

ECOLOGICAL POLYMORPHISM IN ENTEROMORPHA CRINITA¹.

BY A. BROOKER KLUGH.

THE term polymorphism has been used in various senses by different writers. By some it is evidently regarded as synonymous with mutation, while others use it merely as an equivalent for great variability. The concept of polymorphism, as held by the majority of

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