

***GEUM* × *CORTLANDICUM* (ROSACEAE), A NEW NATURAL HYBRID
PLUS THREE *GEUM URBANUM* HYBRIDS
NEW TO THE FLORA OF NEW YORK**

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ABSTRACT

Geum* × *cortlandicum M. Hough, **nothosp. nov.**, a newly discovered natural hybrid of *Geum canadense* and *G. laciniatum* is described from Cortland Co., New York. A photograph of the holotype is provided and differences among the hybrid and the two parents are illustrated. Additionally, *G. ×intermedium* is reported for the first time in North America along with two other *Geum urbanum* hybrids new to New York, *G. ×catlingii* and *G. ×macneillii*. The flowers of all four hybrids and the four species involved are illustrated.

Geum is a cosmopolitan genus of ca 51 species with 20 native to North America if *Waldsteinia* is included (Smedmark 2006; Rohrer 2014). Subg. *Geum* is characterized by the presence of epicalyx bractlets and a hook at the end of the persistent proximal portion of the style (Gajewski 1957). Members of subg. *Geum* have been found to possess a high ability to produce interspecific hybrids experimentally, but most potential hybrids tend to produce mostly sterile achenes and only a few have been identified in nature (Gajewski 1957). Ten species of *Geum* occur naturally in New York, 9 native and 1 introduced, in addition to 6 hybrids (Weldy et al. 2018) when those reported here are included.

The hybrid of *Geum canadense* Jacq. and *G. laciniatum* Murray has been produced experimentally (Raynor 1945; Gajewski 1957), but this report is the first time it has been documented as occurring in nature. It was first observed by the author in 2018 along the bank of the Tioughnioga River in Homer, New York, while searching through a population of *G. laciniatum* for the hybrid *G. ×macneillii*. Ultimately three plants were found at the site and only one good specimen could be made from the material available. The site at Harford, New York, was found several weeks later and chosen as the type location because more plants were present. Another site was found in Seneca Co., New York, with especially robust plants that more closely resemble *G. laciniatum* but still displaying the long hairs on the receptacle and the intermediate number of achenes characteristic of the hybrid. An additional specimen collected by Reznicek et al. in northern Michigan was tentatively determined to be this hybrid in 1991 and, after examination of a photograph of the specimen, is included in the list of vouchers.

The hybrid described here shares many of the characteristics of the artificial hybrids produced by Gajewski. Most flowers appear to be fertile with normal development of achenes; in his experiments, Gajewski found the fertility of achenes of the F1 generation to be just over 50%. *Geum* × *cortlandicum* is named for Cortland Co., New York, where several *Geum* hybrids recently have been found.

Geum* × *cortlandicum M. Hough, **nothosp. nov.** [*G. canadense* × *G. laciniatum*]. **TYPE: USA.**

New York. Cortland Co.: Town of Harford, Cortwright Road, James Kennedy State Forest, in ditch next to road, 42.474449°N, 76.171084°W (WGS84), ca 488 m elev, 21 Jul 2018, *M. Hough s.n.* (holotype: CORT 14515, Figure 1; isotype: BH).

Similar to *Geum laciniatum* but the receptacle with 1–2 mm long bristly hairs over the entire surface as in *G. canadense*, disarticulating near the base as in *G. laciniatum*; petals more consistently white relative to *G. laciniatum*; achenes puberulent and sparsely hirsute, sometimes with a few minute stalked glands toward the apex and on the lower portion of the persistent proximal segment of the style as in some forms of *G. canadense*, totaling 92–188 per receptacle (more than is typical for *G. canadense* but fewer than *G. laciniatum*), more easily removed from the receptacle than in *G. laciniatum*, abortive in some flowers; styles more spreading in fruit than in *G. canadense*; pedicels and stems slightly less densely hirsute than *G. laciniatum* but more so than *G. canadense*; the stipules of the lower cauline leaves of similar width as the parents but sometimes more elongate, the larger ones up to 2–3 cm long on robust plants. Figure 2.

Plants herbaceous, perennial. **Stems** 60–105 cm, erect, stout, puberulent and hirsutulous with mostly deflexed hairs. **Leaves**: basal and lower cauline leaves 17–32 cm long, the blade pinnate with 5–7 primary leaflets alternating with 2–6 minor leaflets; middle cauline leaves trifoliate, 10–16 cm wide × 10.5–17 cm long, leaflets cuneate at the base, the terminal one slightly larger than adjacent laterals; upper cauline leaves simple and 3-lobed to unlobed with sharply serrate margins, 1–7.5 cm wide × 2–11 cm long. **Stipules** of lower cauline leaves ± free, 0.6–1 cm wide × 2–3 cm long, ± incised. **Inflorescences** 8–14-flowered; pedicels puberulent and moderately hirsute; flowers erect; epicalyx bractlets 1–2 mm long; hypanthium green; sepals spreading but soon reflexed, 5–6.5 mm long; petals spreading, white, obovate to elliptic, 3–4.9 mm long, shorter than the sepals, obtuse or rounded at the apex. **Fruiting receptacles** 2.5–3.5 mm long, sessile, hirsute, disarticulating near the base. **Achenes** 3–4 mm, puberulent with a few longer hairs and minute stalked glands about the apex. **Fruiting styles** geniculate-jointed, proximal segment persistent, 3.5–5 mm long, hooked at the apex, ± stipitate-glandular in the lower third; distal segment deciduous, ca 1.5 mm long, proximally short hairy.

Additional vouchers. USA. New York. Cortland Co.: Town of Homer, ca 100 m S of main parking area, Durkee Park, bank of Tioughnioga River, 42.646610°N, 76.174699°W (WGS84), ca 373 m elev, 8 Jul 2018, *Hough s.n.* (CORT 14449). **Seneca Co.:** Town of Seneca Falls, Seneca Meadows Wetlands Preserve, ditch next to main loop trail, 42.941167°N, 76.825412°W (WGS84), 10 Jul 2018, *Hough s.n.* (CORT 14518). **Michigan. Ontonagon Co.:** NE 1/4 sect. 34, T48N R40W, ca 1.5 mi S of Ewen along E bank of S branch of the Ontonagon River, 11 Jul 1991, *Reznicek* 8835 (MICH 1467106).

***Geum urbanum* and its hybrids in New York**

Geum urbanum L. is native to Eurasia and North Africa. It has been present in North America for at least 100 years (Rohrer 2014) with numerous collections from Cambridge, Massachusetts, dating back as far as 1884 (GH), but there are otherwise few collections in herbaria from elsewhere in the Northeast prior to the 1970's. The oldest non-cultivated specimens located for New York both were collected in 1988, one in Onondaga Co. (NYS) and the other in Cortland Co. (CORT). The following are collections housed at CORT.

Vouchers. USA. New York. Cortland Co.: Town of Cortlandville, Hoxie Gorge Nature Preserve, 17 Jul 1988, *Shinherr* 20 (CORT 3790); town of Cortlandville, Lehigh Trail, just E of Gracie Road, 13 Jun 2012, *Hough s.n.* (CORT 14139); town of Homer, ca 100 m N of New York State Route 90, just E of the Cortland-Cayuga county line, 42.643784°N, 76.266503°W (WGS84), ca 404 m elev, 14 Jun 2018, *Hough s.n.* (CORT 14501). **Tioga Co.:** Town of Richford, Michigan Hill State Forest fishing access road off of State Route 38, 42.395191°N, 76.192781°W (WGS84), 5 Jul 2018, *Hough s.n.* (CORT 14505).

This species is now widely established in disturbed forested areas in central New York and, in addition to the collections cited, has been observed by the author in the counties of Cayuga,

Chemung, Delaware, Livingston, Madison, Onondaga, and Tompkins. The widespread range and long flowering period of this species (May-August) create great potential for hybridization with our native species. The following hybrids involving *Geum urbanum* as one of the parents have recently been collected in NY.

Geum* × *intermedium Ehrh. [*G. rivale* × *G. urbanum*]

Voucher. USA. New York. Cortland Co.: Town of Homer, ca 100 m N of New York State Route 90, just E of the Cortland-Cayuga county line, 42.643784N°, 76.266503°W (WGS84), ca 404 m elev, 14 Jun 2018, *Hough s.n.* (CORT 14496). Figure 3.

Geum* × *catlingii J.-P. Bernard & R. Gauthier [*G. canadense* × *G. urbanum*]

Vouchers. USA. New York. Cayuga Co.: City of Auburn, Army Corps of Engineers wetland mitigation, NW of County House Road, 42.976962°N, 76.546757°W, 10 Jul 2018, *Hough s.n.* (CORT 14516). Cortland Co.: Town of Cortlandville, Lehigh Trail near Cortland Marl Ponds, 42.571033°N, 76.229950°W (WGS84), ca 360 m elev, 13 Aug 2016, *Hough s.n.* (CORT 14149); town of Homer, ca 100 m S of main parking area, Durkee Park, bank of Tioughnioga River, 42.646610°N, 76.174699°W (WGS84), ca 373 m elev, 2 Jul 2018, *Hough s.n.* (CORT 14510); town of Tully, Heiberg Memorial Forest, 42.756229°N, 76.080531°W, 3 Jul 2018, *Hough s.n.* (CORT 14511). Onondaga Co.: City of Syracuse, Oakwood Cemetery, 43.033783°N, 76.133321°W (WGS84), ca 180 m elev, 1 Aug 2018, *Hough s.n.* (CORT 14554). Tioga Co.: Town of Richford, Michigan Hill State Forest fishing access road off of State Route 38, 42.395191°N, 76.192781°W (WGS84), 5 Jul 2018, *Hough s.n.* (CORT 14509). Figure 4.

Geum* × *macneillii J.-P. Bernard & R. Gauthier [*G. laciniatum* × *G. urbanum*]

Voucher. USA. New York. Cortland Co.: Town of Homer, ca 100 m S of main parking area, Durkee Park, 42.646610N°, 76.174699°W (WGS84), ca 373 m elev, 14 Jun 2018, *Hough s.n.* (CORT 14494). Figure 5.

Geum × *intermedium* and *G.* × *macneillii* thus far have been found only in one location each in the town of Homer, Cortland Co., New York. The most common hybrid *Geum* in New York appears to be *G.* × *catlingii*, which was first reported by the author in the New York Flora Association Newsletter (Hough 2017) and since has been observed in most places where the two parents occur together. While originally described as highly sterile (Bernard & Gauthier 1986), occasional plants have been found with some normally developed achenes. Flowers of all four hybrids and their parental species are shown in Figure 6.

ACKNOWLEDGEMENTS

I would like to thank Peter Fraissinet, Anna Stalter, and Kevin Nixon of the Bailey Hortorium for their assistance in reviewing *Geum* specimens and access to Raynor's thesis. I am also grateful to Tony Reznicek, Don Leopold, and Linda Curtis for their helpful feedback on the manuscript.

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Figure 1. *Geum* × *cortlandicum*. Holotype, Hough s.n. (CORT 14515).

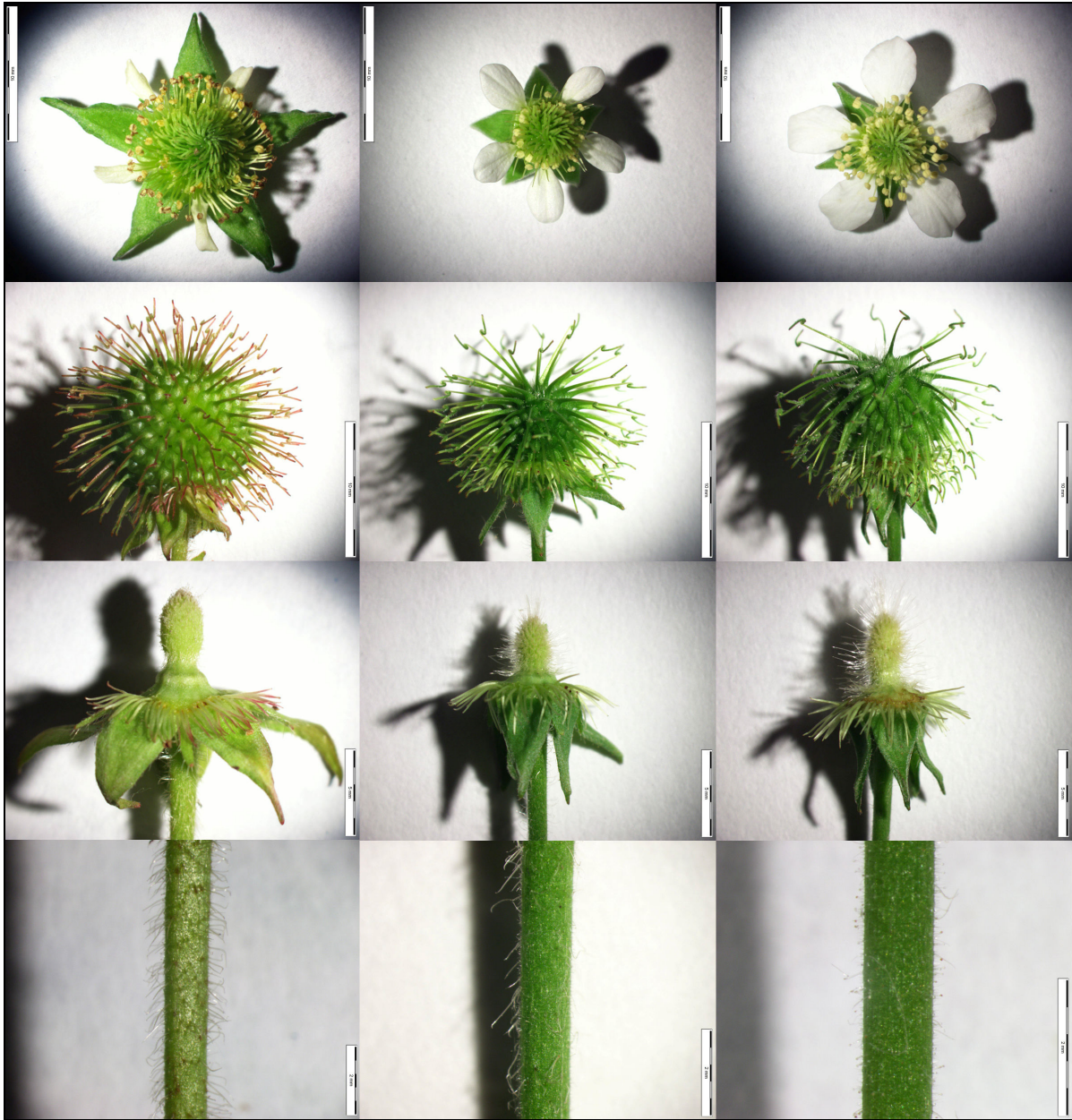


Figure 2. Comparison of floral structures of *G. laciniatum* (left column), *G. ×cortlandicum* (middle column), and *G. canadense* (right column). Top row: flower at anthesis. Second row: head of achenes. Third row: receptacle with achenes removed. Bottom row: pedicel.

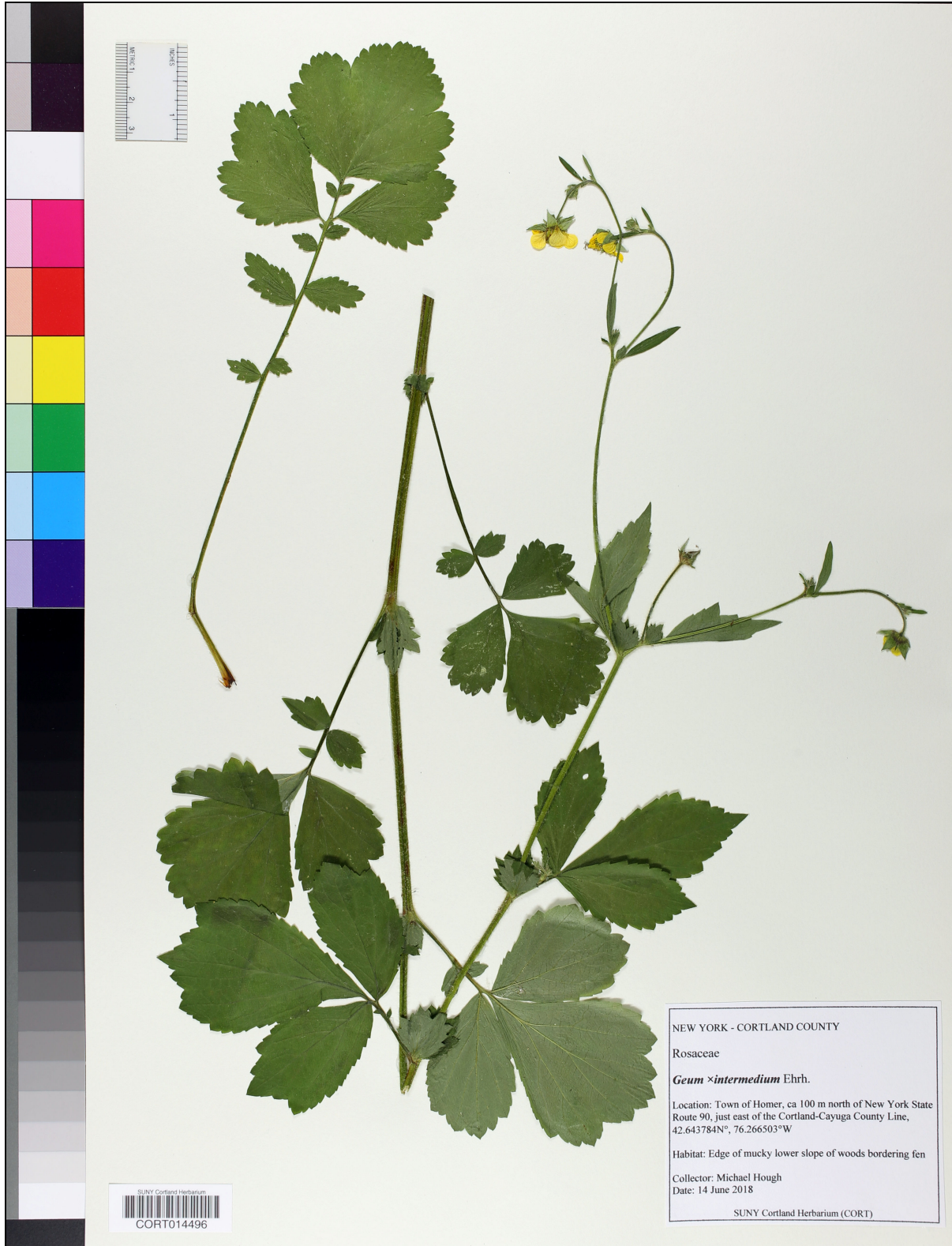


Figure 3. *Geum xintermedium*. Hough s.n. (CORT 014496).



Figure 4. *Geum xcatlingii*. Hough s.n. (CORT 014509).



Figure 5. *Geum xmacneillii*. Hough s.n. (CORT 014494).

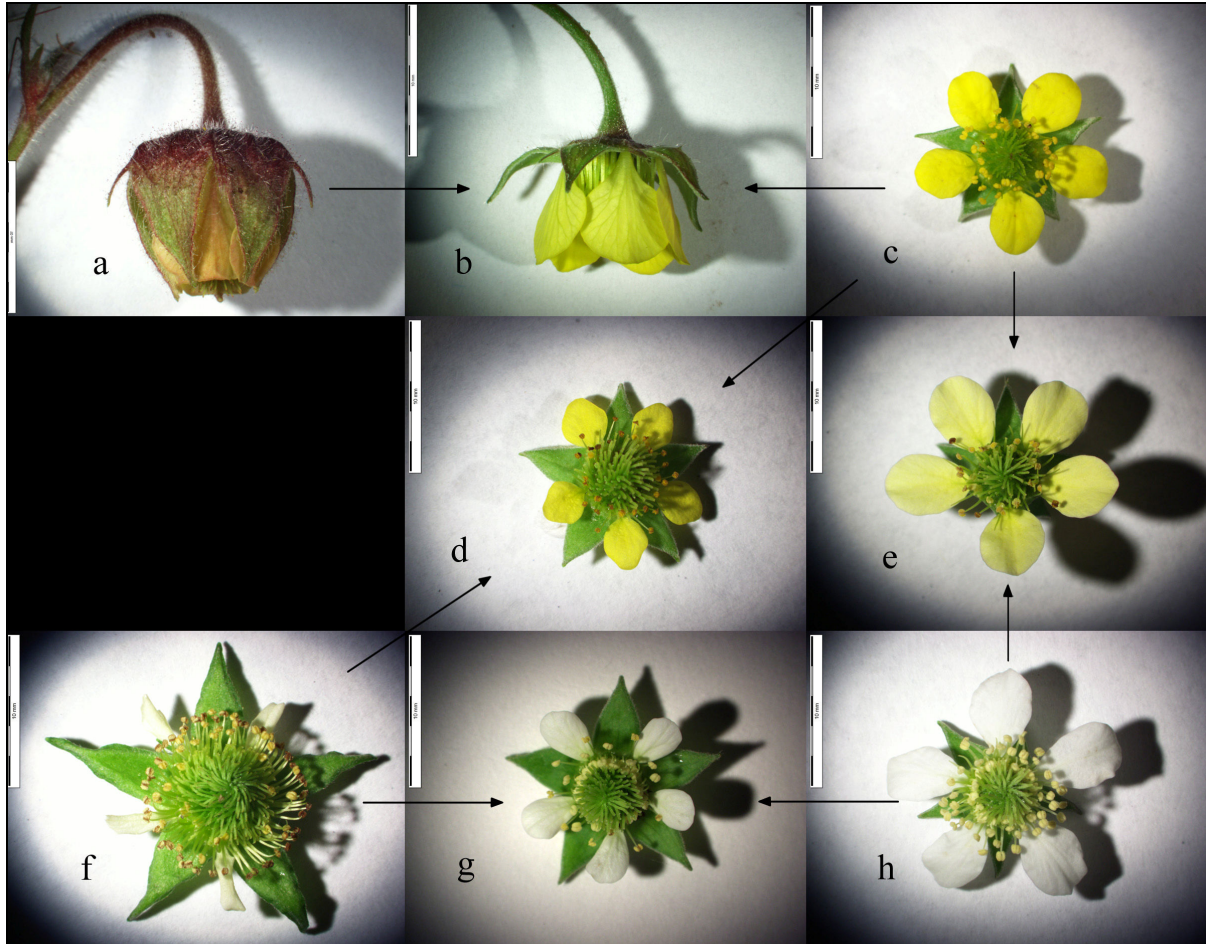


Figure 6. Comparison of flowers of four *Geum* species and their hybrids. Arrows indicate direction of gene flow: a) *Geum rivale*; b) *G. xintermedium*; c) *G. urbanum*; d) *G. xmacneillii*; e) *G. xcatlingii*; f) *G. laciniatum*; g) *G. xcortlandicum*; h) *G. canadense*.