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ADDITIONS TO THE NEW FLORA OF VERMONT

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ABSTRACT

Twenty-two species of vascular plants are reported for the state of Vermont, additional to those reported in the recently published New Flora of Vermont. These are *Agrimonia parviflora*, *Althaea officinalis*, *Aralia elata*, *Beckmannia syzigachne*, *Bidens polylepis*, *Botrychium spathulatum*, *Carex panicea*, *Carex rostrata*, *Eutrochium fistulosum*, *Ficaria verna*, *Hypopitys lanuginosa*, *Juncus conglomeratus*, *Juncus diffusissimus*, *Linum striatum*, *Lipandra polysperma*, *Matricaria chamomilla*, *Nabalus racemosus*, *Pachysandra terminalis*, *Parthenocissus tricuspidata*, *Ranunculus auricomus*, *Rosa arkansana*, and *Rudbeckia sullivantii*. Also new are three varieties: *Crataegus irrasa* var. *irrasa*, *Crataegus pruinosa* var. *parvula*, and *Viola sagittata* var. *sagittata*. Three species that have been reported elsewhere in 2013–2015, *Isoetes viridimontana*, *Naias canadensis*, and *Solidago brendiae*, are also recapitulated. This report and the recently published New Flora of Vermont (Gilman 2015) together summarize knowledge of the vascular flora of Vermont as of this date.

The New Flora of Vermont was recently published by The New York Botanical Garden Press (Gilman 2015). It is the first complete accounting of the vascular flora of Vermont since 1969 (Seymour 1969) and adds more than 200 taxa to the then-known flora of the state. However, the manuscript for the New Flora was finalized in spring 2013 and additional species are now known: those that have been observed more recently, that have been recently encountered (or re-discovered) in herbaria, or that were not included because they were under study at the time of finalization. In the same interval, other taxa have been reported elsewhere and data for those are recapitulated here based on the literature cited and specimens examined. Therefore, the catalogue of plants presented in the New Flora together with the taxa added below complete the entire list of vascular plants known in Vermont as of the date of this paper.

SPECIES AND VARIETIES NEW TO VERMONT

Entries are in the same general format as in the New Flora, including scientific name, place of publication, synonyms, and common name. Specimens are cited for each addition (new collections are deposited at VT) and species and discussions of taxonomy and other issues (e.g. invasiveness) are given where appropriate. For the benefit of users of keys in the New Flora, distinguishing characters are given.

ARALIACEAE

Aralia elata (Miq.) Seeman, J. Bot. 6: 134. 1968. Japanese angelica.

Vermont: **Chittenden County:** Burlington, disturbed forested fragment near Patchen Road on S edge of Centennial Woods Natural Area, 28 Oct 2013, *Testo 385* (VT). South Burlington, Allenwood Inn property, small tree to 3 m, 13 Jul 2014, *Mazowita s.n.* (VT).

Introduced from Japan. This species is considered potentially invasive (NPS 2012). It is well established near New York City (Moore et al. 2009) and known from New Hampshire, Massachusetts,

and Connecticut (Haines 2011). It differs from other *Aralia* in Vermont by shrubby habit with stout, erect woody stems, broad-based, stout prickles, and very large leaves. The inflorescence is a large, broad, showy, white panicle of numerous umbels.

ASTERACEAE

Bidens polylepis S.F. Blake, Proc. Biol. Soc. Wash. 35: 78. 1922. Ozark beggar-ticks.

> **Vermont**: **Franklin County:** Swanton, just E of Tabor Road (Missisquoi National Wildlife Refuge trails parking lot), unmowed damp pasture and along edges of Maquam Bog RR Trail, large patch, about 75 plants, 14 Sep 2013, *Gilman 13150* (VT, NEBC). **Chittenden County:** Colchester, near Winooski City line, under powerlines W side of Winooski Gorge, just S of RR tracks and E of I-89, 11 Sep 2014, *Gilman 14063 & Guerrero-Murphy* (VT, NEBC).

This species was first observed in Vermont at the Franklin County site in September 2013 by Eric Wood, a local wildflower enthusiast. The Vermont populations are disjunct from others in southern New England and New York. Given their habitat in disturbed areas, in one case along a hiking trail and in the other case in a utility corridor, they are likely to have been inadvertently introduced. Native to the American Midwest, other eastern populations of *Bidens polylepis* are considered to represent escapes or naturalized plants (Haines 2011; Voss & Reznicek 2012). This species differs from other *Bidens* in Vermont by its normally 3-compound leaves with narrowly lanceolate segments and large flowers (2–5 cm diameter). It is much showier than other Vermont *Bidens*.

Eutrochium fistulosum (Barratt) E.E. Lamont, Sida 21: 901. 2004. [*Eupatorium fistulosum* Barratt, *Eupatoriadelphus fistulosus* (Barratt) King & H.E. Robinson]. Hollow Joe-Pye weed.

> **Vermont: Rutland County:** Brandon, cleared area E of Hollow Road and W of old Brandon Training School, several large clumps, 3 Oct 2014, *Gilman 14084 & Guerrero-Murphy* (VT).

This species was excluded from the New Flora, no definite specimen having been seen. Jenkins and Zika (1995) discussed reports of this species (as *Eupatorium*) in Vermont and concluded that all were based on large plants of *E. maculatum* (L.) E.E. Lamont. The current, small population reported here is clearly *E. fistulosum* with stems hollow, more than 2 m tall and more than 2 cm diameter at base, and florets only 8–10 per capitulum. It may be that *E. fistulosum* was brought to the region with construction equipment (associated with recent construction in the cleared area) or perhaps, being wind-dispersed, it may be naturally adventive from its natural range, which includes New Hampshire, Massachusetts, and New York. It is also possible that, because the cultivar 'Gateway' is locally and recently popular in horticulture, this population may have originated as an escape.

Matricaria chamomilla L., Sp. Pl. 2: 891. 1753. Chamomile.

> **Vermont: Chittenden County:** Burlington, North Union Street, sidewalk, 26 June 2014, *Pet 15* (VT).

Introduced from Europe. Although reported from Vermont, e.g., in the Flora of North America (Brouillet 2006), no specimens have been encountered until now, although look-alike

Anthemis cotula L. is common and the similar *Tripleurospermum inodorum* (L.) Sch.-Bip., scentless mayweed, also occurs. It differs from the first in non-chaffy receptacle, from the second in its pleasant scent and non-winged achenes. It differs from Vermont's other species of *Matricaria*, *M. matricarioides*, in having showy, rayed capitula.

Nabalus racemosus (Michx.) Hook., Fl. Bor.-Amer. 1: 294. [*Prenanthes racemosa* Michx.]. Glaucous rattlesnake-root, glaucous white-lettuce.

> **Vermont: Windham County:** Wilmington, Haystack Mtn., steeply sloping, open, dominantly herbaceous ski run/lift line adjacent to a 2-track maintenance trail, 2150' [655 m], 17 Sep 2014, *Peters s.n.* (VT).

This species was excluded from the New Flora, no specimen having been seen. It was reported, as *Prenanthes racemosa*, from northwestern Vermont by Dole (1937), supposedly based on a specimen collected in Franklin County: Swanton by Blake, but was excluded by Jenkins and Zika (1995), who could not find a supporting specimen. Blake (1913), who collected other plants in Swanton in 1911, did not mention it and I also have not found a specimen to support Dole's report. Nor have I seen a supporting specimen for the statement by Bogler (2006, as *Prenanthes racemosa*) that it occurs in Vermont. Peters's label lists several "common, old-field" herbs present in the community.

Rudbeckia sullivantii C.E. Boynton & Beadle, Biltmore Bot. Stud. 1: 15. 1901. [*R. fulgida* Ait. var. *sullivantii* (C.E. Boynton & Beadle) Cronquist]. Sullivant's coneflower.

> **Vermont**: **Essex County**: Ferdinand, rough land between Vt. Rte. 105 and RR, W of Wenlock Crossing, small patch, 9 Aug 2014, *Gilman 14054 & Testo* (VT). **Caledonia County**: Danville, N side of US Rte. 2, just E of West Danville, small patch in wet, seepy, calcium-rich road scrape, 22 Sep 2013, *Gilman 13148* (VT, NEBC). Waterford: roadside, Duck Pond Road near Hale Road intersection, 31 Aug 2014, *Gilman 14056* (VT). **Washington County:** Berlin, under airport lighting system, near supermarket, SE corner of intersection of Paine Turnpike & Vt. Rte. 62, large patch, perhaps originating as a throw-away from cultivation but also spreading by seed over a small area, 21 Sep 2013, *Gilman 13144* (VT, NEBC).

This was treated as *R. fulgida* Aiton var. *sullivantii* by Urbatsch and Cox (2006) but Campbell and Seymour (2013) provided a rationale for treating it as a species. It is American, native to areas between the Appalachian Mountains and the Mississippi River. 'Goldsturm' is a popular cultivar in Vermont for landscaped public areas such as restaurant entrances, service station islands, medians, and public squares. Given its popularity and hardiness in the Vermont climate, it is not surprising that this species should become a casual escape.

BUXACEAE

Pachysandra terminalis Sieb. & Zucc., Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4: 182. 1845. Japanese mountain-spurge.

> **Vermont: Bennington County**: Dorset, small patch along old Class IV town road, trail to quarries and Mt. Aeolus, about 100 ft from Dorset Hill Road and 200 ft from nearest residences, 1 Jun 2014, *Gilman 14004, Rosenthal & Testo* (VT).

Introduced from East Asia (China or Japan), *Pachysandra* is occasionally but not commonly used as a landscape plant in Vermont, being only marginally hardy as a wintergreen groundcover. The collection was from a small, spreading patch along an old trail through forest. It presumably originated as a throw-away. A more commonly used groundcover, common periwinkle (*Vinca minor* L.), was also abundant in the immediate area.

This addition represents a new family, Buxaceae Dumort., and a new order, Buxales Takht. ex Reveal, for Vermont. In the New Flora it would be placed between Proteales, Platanaceae, and Saxifragales, Paeoniaceae (APG 2009). Buxales is a small, poorly characterized order but like other near-basal clades within dicots, has instability in the number of floral parts. It is further characterized by racemose inflorescences, small flowers, and seeds with a multi-layered testa (Stevens, 2012).

CHENOPODIACEAE

Lipandra polysperma (L.) S. Fuentes, Uotila, & Borsch, Willdenowia 42: 14. 2012. [*Chenopodium polyspermum* L.]. Many-seeded goosefoot.

> **Vermont: Washington County:** Montpelier, one plant on gravel bar, Dog River, near playing fields/railroad junction, not far upstream of confluence with Winooski River, 21 Aug 2010, *Gilman 10118* (VT).

Adventive from Europe and Asia. This species was excluded from the New Flora, no definite specimen having been seen. Despite searching in the same area for several years, no additional plants were observed. The specimen was re-examined and determined as this species; it has rather blunt leaves and relatively lax inflorescences, representing the typical variety. *Lipandra polysperma* was treated as *Chenopodium polyspermum* by Clemants and Mosyakin (2004) but Fuentes-Bazan et al. (2012) demonstrated that it forms a monospecific genus. Among our chenopods, it differs in having non-farinose, entire leaves, elongate dichasial cymes, flowers spaced singly or in clusters of only 2–4, and non-keeled tepals that do not enclose the fruit. It also differs in having only 1(–3) stamen(s) vs. "almost always" 5 stamens in *Chenopodium s.s.* (Fuentes-Bazan et al. 2012).

CYPERACEAE

Carex panicea L., Sp. Pl. 2: 977. 1753. Grasslike sedge.

> **Vermont: Rutland County:** Mount Holly, North road embankment of Rte. 103, two rhizomatous colonies, 24 Jul 2014, *Peters s.n.* (VT).

This species has a primarily European distribution, although it is also likely indigenous in Greenland (Rothrock & Reznicek 2003). Here, on the embankment of a main paved road, it is likely adventive. In Vermont it is most similar to *C. livida* (Wahlenb.) Willd. from which it differs in being less glaucous, having slightly wider leaves, and having curved, not straight, perigynium beaks. Furthermore, its dry habitat is much different from the wetland habitat of *C. livida*.

Carex rostrata Stokes in With., Bot. Arr. Brit. Pl., ed. 2, 2: 1059. 1787. [Excl. var. *utriculata* (Boott) Bailey]. Beaked sedge.

> **Vermont: Windham County:** Newfane, wetland NE of Elwin Meadow in headwater of Baker Brook, 8 Aug 2012, *Engstrom s.n.* (VT).

This species was excluded from the New Flora, no definite specimen having been seen. Previous editions of the Flora of Vermont (Brainerd et al. 1900; Eggleston et al. 1915; Dole 1937; Seymour 1969) contained numerous reports of *Carex rostrata* but all previous specimens seen have been referred to *Carex utriculata* Boott, a taxon now regarded as a distinct species (Reznicek & Ford 2003). The two are distinguished by coloration (*C. rostrata* is very glaucous vs. green *C. utriculata*), leaf folding as seen in cross-section (U- or V-shaped in *C. rostrata*, W- or M-shaped in *C. utriculata*), and abundance of papillae on the epidermis of the leaves (many in *C. rostrata*, few in *C. utriculata*). They share similar habitats, although in New England *C. rostrata* is generally confined to northern Maine and New Hampshire in wetlands of boreal character (Haines et al. 2004).

Engstrom's field notes further elaborate the Windham County population: "Growing on floating organic mat piece in beaver-impounded fen dominated by *Carex lasiocarpa*, *C. stricta*, [and] *Calamagrostis canadensis.* Notable for its glaucous leaves. Rhizomatous. Other small pieces of floating mat with *Carex rostrata* around 2-meter tall beaver hut in midst of fen."

ERICACEAE

Hypopitys lanuginosa (Michx.) Raf., Med. Repos., ser. 3, 1: 297. 1810. [*H. lanuginosa* (Michx.) Nutt., later combination; *H. lanuginosa* var. *rosea* (Torr.) House, *Monotropa lanuginosa* var. *rosea* Torr.; *H., insignata* E.P. Bickn.; *Monotropa hypopitys* var. *rubra* Farw.; *M. hypopitys* f. *rubra* (Farw.) Seymour]. Reddish pine-sap.

> **Vermont: Chittenden County:** (South Burlington), woods between Spear and Dorset streets, 3 Sep 1902, *Ross s.n.* (VT). **Addison County:** Leicester, Chandler Ridge, 4 Sep 2014, *Burns* (VT, photo!). **Windham County:** Newfane, 15 Sep 1897, *Howe* (VT).

Seymour (1969) provided a key (i.e. based on flower color) that included this reddish variation but did not specifically mention a location or collector, so its presence in Vermont was not addressed in the New Flora. Variation within indigenous pine-sap has long been a source of taxonomic ambiguity in the North American literature. This taxon, differing from *Hypopitys monotropa* Crantz in color (pink to red vs. yellowish) and in flowering period (aautumn vs. mid-summer) has been treated as merely synonymous with that by most recent authors including Fernald (1950), Gleason & Cronquist (1991), Wallace (2009) and Haining and Wallace (2005). However, Haines (2011) recognized it as a species, based on increasing evidence (Klooster & Culley 2010) that it is distinct, even when growing in sympatry with *H. monotropa*. Klooster and Culley (2010) suggested that it might best be considered a subspecies, but no combination at any subspecific rank in *Hypopitys* is available (subspecific combinations are available if the species is maintained in *Monotropa*). Typification of the epithet *lanuginosa* for the red-flowered taxon may be problematic because, in his protologue Michaux (1803) focused on plant pubescence, not on the critical characters of color and phenology. However, a specimen in the Michaux Herbarium at P (IDC fiche 61-5) is labeled "*fleurs rubantes*" (W. Taylor, pers. comm.) and it appears the red-flowered plant was within Michaux's concept of *lanuginosa*. The Vermont collections suggest that *H. lanuginosa* is associated with oak-beech forests in the lower elevations, while *H. monotropa* may be found in mixed or coniferous forests throughout the state. The older collections cited, from Chittenden and Windham counties, were annotated based on their late flowering dates and very pubescent stigma bases (Britton & Brown 1913; Haines 2011). Their color could not be assessed.

JUNCACEAE

Juncus conglomeratus L., Sp. Pl. 1: 326. 1753. Bunch-flowered soft rush.

> **Vermont: Windham County:** Wilmington, near Vt. Rte. 9, wet field, old agricultural land with iron seeps, 8 Aug 2014, *Greene-Swift s.n.* (VT).

This rush is considered to be introduced from Europe to North America (Hämet-Ahti 1980). It has been variously considered a species or a variety of common soft rush (*Juncus effusus* L.) but recent research shows it to be well differentiated from that species (Michalski & Durka 2015). In Vermont it might be confused with *J. effusus* var. *solutus* Fern. & Wieg., some forms of which have relatively compact inflorescences, but it differs in having many fewer ridges of the culm (12–30 vs. 30–60) and a relatively longer sheathing basal leaf (uppermost of several). *Juncus pylaei* Laharpe is also similar but is often a larger plant with a more open inflorescence and its inflorescence bract is tight vs. somewhat inflated at the base in *J. conglomeratus*.

Juncus diffusissimus Buckley, Proc. Acad. Nat. Sci. Philadelphia 14: 9. 1862. Slim-fruited rush.

> **Vermont**: **Chittenden County:** Essex, former earth extraction area known as the "Bushey Sand Pit," N of Vt. Rte. 117 (opposite N Williston Road), commonly scattered over a wide area, 5 Nov 2013, *Gilman 13159* (VT, NEBC).

Juncus diffusissimus is unlikely to be confused with any other rush. A member of subgenus *Septati* Buch., which is characterized by septate-nodulose leaves, its distinguishing characters are its caespitose habit, large open inflorescences with widely divergent branches, capitula with typically 3–10 flowers, and narrow, slender, elongate capsules, as much as two times as long as the perianth. It is known to be undergoing significant range expansion to the north and east of its natural range (Lamont & Young 2005; Haines 2011). Lamont and Young (2005) indicated that habitats in the range expansion area are often heavily disturbed by heavy machinery and are typically on sandy soils, especially if seasonally damp. It seems likely that it entered this site — an earth extraction area — as seeds on earthmoving equipment or in soil from another state.

LINACEAE

Linum striatum Walt., Fl. Carol., 118. 1788. Ridged yellow flax.

> **Vermont: Windham County:** Dummerston, few in wet access road in a cleared area, N side of the West River, 3 Oct 2014, *Gilman 04083 & Guerrero-Murphy* (VT).

Indigenous species of *Linum* are poorly represented in Vermont, with only *L. medium* (Planch.) Britton and *L. sulcatum* Riddell previously known, and those are from very few collections (Gilman 2015). *Linum striatum* is known from Massachusetts and southward and appears to be adventive to this site. It is a species of wet habitats vs. the somewhat similar *L. virginianum* L. (not in Vermont), which favors dry habitats. Morphologically, it differs in having ridged stems (the ridges decurrent from leaf bases) and eciliate septa of the fruit (i.e., the margins of the fruit segments lack hairs).

MALVACEAE

Althaea officinalis L., Sp. Pl. 2: 686. 1753. Marshmallow.

> **Vermont: Washington County:** Plainfield, Great Brook Road near Maxfield Road, in area with houses but no cultivated plants nearby; seems to be an escape or unintentional introduction, one large plant, 27 Jul 2012, *Gilman 12079* (VT, NEBC). **Addison County:** Addison, N end of Mountain Road near Vt. Rte. 17, below Snake Mountain, 10–15 plants scattered and appearing naturalized, dirty with road-dust, 10 Aug 2013, *Gilman 13099 & Greene-Swift* (VT, NEBC).

Introduced from Europe. These populations probably represent localized escapes from horticulture. No other species of *Althaea* occur in Vermont and these plants are unlikely to be confused with any other local genus of Malvaceae. Especially distinctive is its pale grayish-green aspect due to the heavy indumentum of woolly hairs. Although widely known for its culinary and herbal uses, i.e. as marshmallow, such use is not traditional in Vermont. Hill (2015) noted that there are not many recent records for this species in North America.

OPHIOGLOSSACEAE

Botrychium spathulatum W.H. Wagner, Amer. Fern J. 80: 77. 1990. Spatulate moonwort.

> **Vermont: Bennington County:** Dorset, Mt. Aeolus, light woodland on old disturbed site, near quarry, 1 Jun 2015, *Rosenthal s.n.*. (IA; photo VT).

This is the third species of recently described moonwort to be discovered in Vermont, all at the same macrosite; others are *Botrychium ascendens* W.H. Wagner and *B. campestre* W.H. Wagner & Farrar (Gilman 2015). The specimen cited here was sent to Don Farrar, Iowa State University, who identified it based on allozyme analysis. The populations of all three at this site are quite small.

This species differs from other moonworts in Vermont in several characters. From the co-occurring *Botrychium ascendens* and *B. campestre*, it differs conspicuously in having pinnae that are spatulate to broadly fan-shaped with nearly entire, rounded distal margins (vs. nearly linear to narrowly fan-shaped with crenate to dentate distal margins). Across its range, *B. spathulatum* may have pinna margins with shallowly incised, rounded lobes, while those observed locally have, at most, very shallowly crenate pinna margins. *Botrychium spathulatum* may also be confused with *B. minganense* Vict. but it has sessile vs. stalked trophophores and the basal pinnae are larger than the next most basal pair (smaller in *B. minganense*). It is an allotetraploid related to *B. campestre* (Hauk et al. 2012).

PAPAVERACEAE

Macleaya cordata R. Br., Narr. Travels Africa, app. 218. 1826. Plume poppy.

> **Vermont: Rutland County:** Proctor, vacant field, 16 Sep 1924, *Kittredge s.n.* (VT).

Introduced from East Asia (China or Japan), this species was excluded from the New Flora, the specimen cited above being overlooked during development of the New Flora. It was mentioned by Dole (1937) but also overlooked, or not found, by Seymour (1969). Plume poppy is occasionally cultivated in Vermont and the specimen appears to represent a casual escape. This monotypic genus is much different from other Papaveraceae in Vermont, plume poppy being a tall, robust perennial with small, non-showy, wind-pollinated flowers.

POACEAE Tribe **Poeae**

Beckmannia syzigachne (Steud.) Fern., Rhodora 30: 27. 1928. Sloughgrass.

> **Vermont: Addison County:** Shoreham, wet depression in hayfield, low terrain near Lemon Fair River, 18 Jul 2014, *Gilman 14027* (VT).

A tall annual grass of wet habitats, *Beckmannia syzigachne* is native in North America. It is very distinctive in appearance. Its inflorescences are erect panicles with short, ascending racemose branches. Spikelets are densely arrayed on the racemes and individually are very compressed. The glumes are enlarged, and spongy-inflated. They are each D-shaped and face each other, giving the individual spikelet a nearly round, winged appearance. The lemma and palea are enclosed by the glumes, although their tips protrude. *Beckmannia* is most closely related to *Alopecurus* L. (Xu et al. 2009) but, given these characters, it is unlikely to be confused with that genus or any other grass in Vermont. It is likely adventive from farther west. The habitat of the current population, an unmowed wet, muddy swale in a hayfield, is similar to that described elsewhere in North America. Introduction by waterfowl is a likely explanation for its presence.

RANUNCULACEAE

Ficaria verna Huds., Fl. Angl., 214. 1762. [*Ranunculus ficaria* L.]. Lesser celandine, fig crowfoot.

> **Vermont: Chittenden County:** Salmon Hole Park, S side of Winooski River, disturbed open woods in sandy soil and along open bank, 29 Apr 2014, *Testo 406* (VT, 2 sheets).

Introduced from Europe. The population from which the specimen cited was collected was first detected ca. 2006 by Leif Richardson (pers. comm.) but no specimen was collected at that time. In 2014, it was abundant at this location (W.L. Testo, pers. comm.). This species was treated as *Ranunculus ficaria* in the Flora of North America by Whittemore (1997) but Emadzade et al. (2010) concluded that *Ficaria* is best treated as a segregate genus. It differs from *Ranunculus* in several "distinct features: three sepals, more than five petals, and stalked but non-beaked achenes" (Emadzade et al. 2010). Haines (2011) indicated that some New England collections belong to subsp. *bulbifera* Á. & D. Löve; no bulbils are present on the above-cited specimens, collected at anthesis.

Ranunculus auricomus L., Sp. Pl. 1: 551. 1753. Goldilocks buttercup.

> **Vermont: Essex County:** Concord [mislabeled as Caledonia County: Kirby], Hutchinson Farm, 27 May 1920, *Hutchinson s.n.* (SJFM); Concord Twp., West Concord, near junction of US Rte. 2 and Kirby Hill Road, roadside ditches and abundant in fields, covering 1000's of square feet, 24 May 2015, *Gilman 15006* (VT, NEBC).

Apparently adventive from Europe. This aggregate species has been reported in North America only from East Greenland (Whittemore 1997) and Alaska (Elven 2015), although the latter plants are referred to a segregate (micro)species, *R. ponojensis* (Markl.) Ericsson (Elven 2015).

Ranunculus auricomus sensu lato occurs throughout much of Eurasia and is not confined to arctic or subarctic regions. It exhibits both sexual and apomictic elements and is characterized by an abundance of microspecies. Hörandl et al. (2009) investigated several clades in the group and came to the conclusion that only the sexual elements should be named as species because the microspecies, even those with invariant morphology, may each have numerous origins. Plants found in Vermont may be apomictic, as they have some apetalous flowers with poorly formed pollen. They have no

scales (cataphylls), rather deeply 3-divided basal leaves, cauline leaves with entire or nearly entire, linear lobes, glabrous leaves and stems, and pubescent achenes. In the treatment of Tutin and Akeroyd (1993), they key directly to *R. auricomus*, and they comport with the probable type, Sheet 715.21 of the Linnean Herbarium (2016). *Ranunculus auricomus* is readily distinguished from other non-native buttercups of open fields in Vermont. From *R. acris* L. it differs by its smaller size, more deeply divided basal leaves, cauline leaves with linear, entire or nearly entire segments, and less compressed, pubescent achenes. It differs from *R. bulbosus* L. in these characters, its lack of a swollen stem base, and in sepals not reflexed at anthesis.

In 1920, local botanist Inez A. Howe of the Fairbanks Museum (SJFM) in St. Johnsbury reported *Ranunculus boreanus* Jord. from Vermont (Howe 1920). She had received a specimen in 1917 from a correspondent, Miss Edith Hutchinson, who indicated that it grew "plentifully on her father's farm," which was in West Concord (Childs 1887), i.e. the same general area as the current collection of *R. auricomus*. Howe identified it by reference to a recently published report of *R. boreanus* in New York (Phelps 1919) that emphasized that species's early flowering date and its finely dissected leaves — also characters of *R. auricomus*. (Later in 1920, the specimen cited here was collected and deposited at SJFM.). *Ranunculus boreanus* is now synonymized with *R. acris* L. (Coles 1971). Following the discovery of *R. auricomus* in 2015, I inspected the SJFM specimen of "*R. boreanus*" and confirmed its identity as *R. auricomus*. It now seems likely that *R. auricomus* has been in Vermont for nearly a century. Its manner of introduction is unknown, but was likely to have been related to agriculture.

ROSACEAE

Agrimonia parviflora Aiton, Hort. Kew. 2: 130. 1789. Small-flowered agrimony.

> **Vermont: Rutland County:** Clarendon, east side of Vt. Rte. 7B, N of airport, at edge of wetland in old field. 15 Jul 2015 (foliage) & 15 Sep 2015 (fruit), *Greene-Swift s.n.* (VT).

Known from New York, Massachusetts, and points south and west (Kline & Sørenson 2015), this species differs from other agrimonies occurring in Vermont in having more numerous leaflets (ca. 5–8 pairs vs. 2–4 pairs). Given its position here in a man-altered landscape, albeit an abandoned field not in current use, and the species' obvious dispersal capabilities via its "stick-tight" or "beggar's-tick" fruits, it is likely that this small colony represents a recent introduction.

Crataegus irrasa Sarg., Rhodora 5: 116. 1903. var. ***irrasa*.** Zigzag hawthorn.

> **Vermont**: **Caledonia County:** Newark, W side of Vt. Rte. 114, 1.0 mi S of Hawk Rock Road, just S of a small tributary to the East Branch of the Passumpsic River, large patch, 21 May, 15 Jun, 27 Jul, and 25 Aug 2013, *Gilman 13023* (VT, NEBC).

This taxon was reported from Vermont by Seymour (1969) but all specimens cited by him are referred to *C. oakesiana* Eggl., which is recognized as a separate species in the New Flora (Gilman 2015). That species is a near endemic, described (Eggleston 1907) from Bloomfield, Essex County, Vermont, and distributed in a few towns along the upper Connecticut River in Vermont and New Hampshire. These areas are approximately 20–40 km distant from the current population of *C. irrasa* var. *irrasa*.

Crataegus irrasa var. *irrasa* is, indeed, much like *C. oakesiana* (Fig.1a). Both have a thicket-forming habit, pubescent inflorescences, flowers with 20 stamens, and pale yellow anthers. Seymour's disposition, therefore, is understandable. Nevertheless, the two differ significantly in leaf shape, those of *C. irrasa* being more broadly truncate (to even slightly cordate) and having broader, larger lobes (Fig. 1b). The leaf bases of mature foliage sometimes cannot be pressed without folding due to their subcordate shape. Notably, Seymour (1969) illustrated leaves of most Vermont hawthorn taxa (in many instances with photos of type material) but did not include an illustration of either *C. irrasa* var. *irrasa* or of *C. oakesiana*. *Crataegus irrasa* is also represented in Vermont by the pink-anthered var. *blanchardii* (Sarg.) Eggl., a taxon recently transferred to *C. chrysocarpa* (Phipps

a. *C. oakesiana* b. *C. irrasa* var. *irrasa* c. *C. chrysocarpa*

Fig. 1: Local representatives of *Crataegus* Ser. *Rotundifoliae* showing leaf shapes at anthesis. Note the broadly cuneate floreal leaves of *C. oakesiana* (a) and *C. chrysocarpa* (c); those of *C. irrasa* (b) are broadly truncate to nearly cordate.

2007). That variety is known from the Green Mountains of southern and north-central Vermont, but not from the northeastern part of the state. The species was described from Île de Montréal, Québec (Sargent 1903), about 180 km distant, and is otherwise known from Québec, Michigan, and New York (Palmer 1952). Phipps (2015) noted that it was "to be expected in New England." The current population of *C. irrasa* var. *irrasa* is from a roadside thicket and may have been casually introduced.

Another taxon on Series *Rotundifoliae* Rehder that is characterized by twenty pale yellow anthers is *Crataegus chrysocarpa* Ashe var. *vigintistamina* J.B. Phipps, but *C. chrysocarpa* has "rather differently formed leaves" (Phipps 2007; and see Fig. 1c above). Variety *vigintistamina* is not known to occur in the state.

Crataegus pruinosa (Wendl. f.) K. Koch var. ***parvula*** (Sarg.) J.B. Phipps, Canad. J. Bot. 58: 1684. 1980. Small-leaved frosted hawthorn.

Vermont: Rutland County: West Rutland, 15 Sep 1899, *Eggleston & Brainerd* (GH).

The recent publication of the Flora of North America revision of hawthorns (Phipps 2015) reveals a few discrepancies with the treatment in the New Flora, which was based on that of Haines in Flora Novae-Angliae (2011). They will not be recapitulated here except to note this small-leaved variety of *Crataegus pruinosa*, which was placed in synonymy of the typical variety by Haines (2011) but recognized by Phipps (2015). It has nowhere been reported from Vermont, including the Flora of North America (Phipps 2015) and was not included in synonymy of *C. pruinosa* in the New Flora. Nevertheless, the above-noted specimen, annotated by Phipps, has been seen. Haines (pers. comm.) finds that there are other named varieties connecting taxon *parvula* directly to the typical variety, and considers it not sufficiently distinct to warrant recognition.

Rosa arkansana Porter, Syn. Fl. Colorado 38. 1874. [*R. arkansana* var. *suffulta* (Greene) Cockerell]. Prairie rose.

> **Vermont**: **Essex County:** Brighton, large clone, field margin, S side of Vt. Rte. 105, just W of Boylan State Airport, 5 Jul 2014, *Gilman 14025* (VT, MO). Ferdinand, N side of Vt. Rte. 105 just W of Wenlock, edge of maintained roadway, small patch (10–15 stems) (note that woody stems have been mowed in a portion of the group), 17 Aug 2013, *Gilman 13109* (VT, NEBC, MO).

Rosa arkansana was casually mentioned for Vermont in the Flora of North America by Lewis et al. (2014), based on the cited Ferdinand specimens, but it was not mapped nor was Vermont among the states listed in the statement of range. It is native to the central part of the continent (Erlanson 1929) and occurrences farther east are likely to have been introduced (Voss & Reznicek 2012; Lewis et al. 2012). In northern New England, it is also known from man-altered habitats such as old fields and along railroads in Maine and New Hampshire (specimens at NEBC!). Its discovery in northeastern Vermont along a two-lane highway — and not far from a railroad — is consistent with this pattern.

This species is much like *Rosa blanda* Ait., differing in leaflets normally (7–)9(–11) vs. (5–)7(–9), in stems prickly along their entire lengths, including current year's growth vs. prickly only on older stems, and in inflorescences terminating erect new shoots vs. on spreading lateral shoots. The Vermont plants are moderately pubescent and represent the eastern phase of the species sometimes segregated as var. *suffulta*. Lewis et al. (2012), however, did not recognize that variety.

VIOLACEAE

Viola sagittata Aiton, Hort. Kew 3: 287. 1789. var. ***sagittata***. Arrow-leaved violet.

> **Vermont: Orleans County:** Town line of Greensboro-Glover, 24 Aug 1968, *Gates & Urie* (VT).

The typical variety of arrow-leaved violet was excluded from the New Flora because the specimen cited here was overlooked during its development. It represents the expression of the species with elongate leaf blades that are prominently and narrowly lobed at base, while var. *ovata* (Nutt.) Torr. & A. Gray, which is frequent in Vermont has more ovate, unlobed or only poorly lobed leaves. The specimen cited bears one fruit elevated on a peduncle approximately half the height of the entire specimen. The location in northern Vermont is somewhat remote from other known populations in New England.

Viola sagittata var. *sagittata* was mapped for Vermont by Russell (1965) based on specimens, collected by others (VT!) that he had personally annotated as "nearer" var. *sagittata* than var. *ovata*.

In the New Flora, I regarded those specimens as too equivocal to support Russell's report. The report by Seymour (1969) from Windsor County: Barnard, was based on his own collection, *Seymour 23,560* (VT!), which is a specimen of var. *ovata*. McKinney (1992) did not map var. *sagittata* from Vermont and cited no Vermont specimens, and Little and McKinney (2015) excluded it as well.

VITACEAE

Parthenocissus tricuspidata (Siebold & Zucc.) Planch., Monogr. Phan. 5: 452. 1887. Boston ivy.

> **Vermont**: **Chittenden County:** Burlington, apparently spontaneous on cement block wall facing Lake Champlain, Burlington Bikepath, near the Old Barge Canal; no apparent landscape plantings in area, 4 Jul 2008, *Gilman 08043* (VT).

Introduced from East Asia (China or Japan), this species was inadvertently not included in the New Flora. Boston ivy is marginally hardy in Vermont and is seldom used as building-climbing plant. Even so, the specimen probably represents a local escape from cultivation: although it was growing on hardscape, it was not in an area of softscape plantings. Boston ivy is readily distinguished from other Vermont *Parthenocissus* by entire vs. pentafoliolate leaves and from *Vitis* (which has similar leaves) by non-shreddy bark and tendrils with adhesive disks.

ADDITIONS FIRST REPORTED ELSEWHERE

Three species have been newly reported by others for Vermont since 2013 and are briefly recapitulated here. Additionally, Phipps (2015) newly reported *Crataegus chrysocarpa* Ashe var. *subrotundifolia* (Sargent) J.B. Phipps from Vermont, but the basis of that record has not been ascertained. There are no specimens so named at VT, A, GH, or NEBC.

ASTERACEAE

Solidago brendiae Semple, Phytoneuron 2013-57: 1–4, figs. 1–2. 2013. Brenda's goldenrod.

> **Vermont: Essex County:** Granby, 30 Sep 1972, *B.H. Stearns* (VT).

Semple (2013) recently described this species of eastern Canada. It is much like *Solidago canadensis* L. but has more prominently bracteate, minutely glandular inflorescences, slightly larger capitula, and more ray florets. The specimen cited was discovered upon review of goldenrod specimens at VT by Gilman, specifically searching for records of *S. brendiae* in Vermont, and was confirmed as such by Semple (Semple & Gilman 2015). Essex County is at the southern edge of the boreal zone favored by *S. brendiae*.

HYDROCHARITACEAE

Najas canadensis Michx., Fl. Bor.-Amer. 2: 220. 1803. Canada naiad.

> **Vermont: Franklin County:** Swanton, Missisquoi National Wildlife Refuge, 24 Aug 1962, *Moses s.n.* (VT). **Grand Isle County:** North Hero, 8 Aug 1878, *Flynn s.n.* (VT). **Chittenden County:** Back Bay, Aug 1908, *Jones s.n.* (VT). **Orange County:** Brookfield, Baker Pond, 29 Aug 1972, *Seymour 30,075* (VT). **Washington County:** Calais, Bliss Pond, 13 Sep 1968, *Seymour 27,140 p.p. & Dudey* (VT). **Windham County:** Ct. River N of Bellows Falls, 14 Aug 1986, *Hill 17053* (VT).

Les et al. (2014) distinguished this taxon, which is a tetraploid derived from crosses between *N. flexilis* (Willd.) Rostk. & W.L.E. Schmidt and *Najas guadalupensis* (Spreng.) Magnus, as a "cryptic, sympatric species." It occurs with *N. flexilis* across much of the latter's range in North America and has been confused with that species in the past. Canada naiad can be distinguished from *N. flexilis* by its "thick," plumply fusiform seeds (< 3.0× as long as wide) vs. "thin," narrowly fusiform seeds (>3.0× as long as wide). Les et al. (2014, fig. 1) mapped a population from western Vermont, and review of specimens as listed above confirm that it is widespread in the state. *Najas flexilis*, also mapped by Les et al. (2014), is also widespread in Vermont.

ISOETACEAE

Isoetes viridimontana M. Rosenthal & W.C. Taylor, Amer. Fern J. 104: 7. 2014. Green Mountain quillwort.

> **Vermont: Windham County:** Wilmington, Haystack Pond, 20 Aug 2013, *Taylor 6743 et al.* (holotype US, isotype VT).

This newly described species (Rosenthal et al. 2014) is known from only one site. It differs from other quillworts by its small size (maximum number of leaves 17 and maximum number of megaspores 40), granulate to rugulate megaspores ca. 0.36 mm in diameter, and echinate microspores. It is diploid (2n =22) and is most closely related to *Isoetes engelmannii* A. Braun (Rosenthal et al. 2014). Because of its rarity, it is of conservation concern and has been added to Vermont's statutory list of threatened and endangered, legally protected species.

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