

ADDITIONS TO THE NEW FLORA OF VERMONT—II.

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ABSTRACT

Twenty-seven species and one variety are newly reported for the flora of Vermont. Four species that have been reported elsewhere also are briefly summarized.

This is the second list of vascular plants not recorded in the New Flora of Vermont (Gilman 2015) but now vouchered from the state. The first list of additions (Gilman 2016) added 25 new taxa (22 species and 3 varieties) and recapitulated three other species that were reported elsewhere. Several other taxa remain under review for possible inclusion as members of the vascular flora of Vermont, including in the genera *Callitriche*, *Cyperus*, *Elatine*, *Mentha*, *Taraxacum*, and *Viola*.

The format of the entries is similar to that of the New Flora and the first list of additions.

ALISMATACEAE

1. *Sagittaria australis* (J.G. Sm.) Small, Fl. S.E. U.S. 45–46. 1903. Appalachian arrowhead.

Chittenden Co: Winooski, large island immediately downstream of Winooski Falls in drawn down wet gravelly sandbar flats east (upstream) of the upland part of the island; this area exposed, but usually under 1 ft of water, rare scattered plants, 17 Oct 2016, *Marcus s.n.* (VT).

The range extension of *Sagittaria australis* to a site on the Winooski River slightly upriver of where it enters Lake Champlain is noteworthy. The closest known locations are in New Jersey and Pennsylvania (Haynes & Hellquist 2000), more than 200 miles distant; reports from New York (e.g. Gleason & Cronquist 1991; Haynes & Hellquist 2000) are apparently in error (Werier 2017). The identification of the cited specimen was confirmed by R. Haynes (pers. comm. to A. Marcus, 17 Oct 2017). *Sagittaria australis* differs from the very common *S. latifolia* L. by its free, stiff, slightly fleshy vs. partially connate, lax, and chartaceous bracts and by achene beaks erect at base and slightly to strongly recurved above vs. horizontal. It is readily distinguished from the recently reported *S.*

engelmanniana J.G. Sm., which is rare in Vermont but occurs not far distant, by the lack of facial glands on the achenes and by recurved vs. merely ascending beaks of the achene; and from emerged forms of *S. cuneata* Sheldon by longer achene beaks that are inserted at the upper angle of the achene rather than at summit.

The mode of introduction to this aquatic system is unknown but was perhaps via cultivation as a water plant. The population is small (ca. 20 plants) and is confined to an alluvial (fine gravel mixed with coarse sand) mid-river island where plants are sometimes exposed to strong flows and subject to rapid inundation and exposure. This island is below the fall line, at an elevation of approximately 99.0 ft to 100.5 ft and is within the flood elevation of Lake Champlain so the habitat, while riverine, is subject to lake influence at high water. Despite a high-energy environment, the population has persisted at least four years, 2016–2019.

AMARANTHACEAE

2. *Chenopodium berlandieri* Moq. var. *macrocalycium* (Aellen) Cronq., Man. Vasc. Pl. N.E. U.S. (ed. 2) 863. 1991. Beach pit-seeded goosefoot.

Chittenden Co: Burlington, Starr Farm Beach, few on upper strand, 17 Oct 2018, *Gilman 18096* (VT); Starr Farm Beach, sandy beach exposed by low water levels of Lake Champlain, 44.515954, -73.268952, 27 Oct 2018, *S. Fawcett 1020, Gilman, Davis & Miller* (VT). Colchester: RR embankment, 12 Oct 1912, *Flynn s.n.* (VT-061841, VT-061853); Delta Park, high sandy beach north of the mouth of the Winooski River, a very low water year, 5 Oct 2016, *Gilman 16111, Marcus, and members of the Vermont Scientific Advisory Group – Flora* (VT, NEBC). Winooski: Winooski River, floodplain on N bank S of downtown, 44.48972N, -73.1966W, 30 Oct 2018, *Fawcett 1026 & Marcus* (VT).

As treated by Clemants and Mosyakin (2003), var. *macrocalycium* is a non-weedy beach-habitat variety of the widespread *C. berlandieri* and in Vermont is likely a relict of the ancient Champlain Sea along with such taxa as *Lechea maritima*, *Hudsonia tomentosa*, and *Lathyrus japonicus* var. *maritimus*.

It was excluded by Jenkins and Zika (1995), who noted that a Flynn specimen (VT-061853) annotated (at species rank) as *C. macrocalycium* by Wahl was a duplicate of one he annotated as *C. bushianum* Aellen (VT-061841) on the same date. Gilman (2015) concurred with this decision and also excluded this taxon from Vermont. Following Marcus's (2016) discovery of *C. berlandieri* on sand beaches of Lake Champlain in the Burlington–Colchester area, the Flynn specimens were reviewed and both were determined as var. *macrocalycium*. The recent collections are much-branched proximally with erect branches and relatively poorly toothed leaves, differing in aspect from var. *bushianum*, which has loosely arching-erect branches and more prominently toothed leaves. The Winooski River population, which occurs on a steep sandy riverbank and exposed damp sands at the base of the bank, consists of plants that are more robust than typically described (e.g., Haines 2011) from coastal habitats, sometimes growing to 1 m or more, perhaps a consequence of high available nutrient levels. Variety *bushianum* is also rare in Vermont, and we note that there has been little recent attention paid, locally and in general, to the systematics of these closely related but rather poorly defined varieties.

3. *Chenopodium ficifolium* Sm., Fl. Brit. 1: 276–277. 1800. Fig-leaved goosefoot.

Washington Co: Montpelier, US Rte 2, large plants on spoil pile (loam, gravel, sand) under I-89 overpass, 21 Aug 2010, *Gilman 10116* (VT-061094).

Based on its reticulate-honeycombed pericarp, this collection was cited in the New Flora of Vermont (Gilman 2015) as *C. berlandieri* var. *bushianum* (Aellen) Cronq., which was the only pit-seeded goosefoot known in Vermont at the time. Recent reviews of all available Vermont pit-seeded goosefoot material and additional fieldwork have resulted in revision of this collection. It conforms in pericarp ornamentation, seed-size (ca. 1.2 mm), and leaf shape with published descriptions and images of *C. ficifolium*; and conforms to the typical subspecies with basal leaf lobes that are antorsely directed, vs. perpendicular to the leaf axis in ssp. *blomianum* (Aellen) Aellen (Mosyakin 2016). In North America, this species is considered introduced or adventive from Europe and Asia (Clemants and Mosyakin 2003).

4. *Dysphania pumilio* (R. Br.) Mosyakin & Clemants, Ukrayins'k Bot. Zhurn., n.s. 59(4): 382. 2002. Clammy glandular-goosefoot.

Rutland Co: Rutland, Post Road, just NE of Vermont National Reserve facility, abundant weed in small field of corn, soybeans, and pumpkins, 13 Sep 2018, *Gilman 18073* (VT, NEBC).

This is an annual agricultural or ruderal weed (e.g., common in New York City, D. Werier, pers. comm.), originally from Australia but now more or less cosmopolitan (Clemants & Mosyakin 2003). Zhang and Zhu (2016, 2017) transferred it and two other non-native Vermont weeds, *D. botrys* L. and *D. ambrosioides* L. from the genus *Dysphania* to the resurrected genus *Neobotrydium* Moldenke, based on their dichasial-cymose (vs. spicate or paniculate) inflorescences. These species all share strongly aromatic, yellowish, globose glandular hairs.

APIACEAE

5. *Myrrhis odorata* (L.) Scop., Fl. Carniol. ed. 2, 1: 207. 1771. Sweet Cicely.

Orleans Co: Craftsbury, W side of Vt. Rte. 14, a short distance N of Eligo Pond, 11 Jun 2016, *Gilman 16024* (VT-288703, NEBC).

Sweet Cicely, a native of Europe, differs from other local Apiaceae in rather densely pubescent, finely divided leaves that are often mottled with small whitish patches, and elongate, anise-scented fruits. It is somewhat reminiscent of the very invasive *Anthriscus sylvestris* (L.) Hoffm., but the upper leaf-sheaths are not inflated, the inflorescences are broader and more erect, and the fruits are strongly ridged (Tutin 1980). It is frequently grown by herbalists and landscapers for its anise-scented seeds, attractive foliage, and large umbels of white flowers, and it is sometimes observed spreading near gardens (Gilman, personal observation). The Craftsbury collection, however, was from a large roadside patch not associated with any residence. It is also known as a local escape in Massachusetts and Connecticut (CNH 2019).

6. *Selinum carvifolia* (L.) L., Sp. Pl., ed. 2, 350. 1762. Little-leaved angelica.

Bennington Co: Mt. Tabor, large patch, ditch and edge of damp pasture, US Rte. 7, 4 Sept 2004, *Gilman 04179* (VT-085810, VT-085830). Sunderland: A number of tall plants along logging road, just upslope, E side of Batten Kill, near River Road just S of Manchester town line, 14 Nov 2001, *Gilman 01184* (VT 085809).

Following collection of the above-cited specimens from disturbed, rather open habitats, the senior author long assigned them to *Conioselinum chinense* (L.) Britton, Sterns, & Poggenb., which, however, is a species that occurs in undisturbed, forested wetlands, riverbanks, and seepy ledges. Upon recent re-examination, they were shown to be *Selinum carvifolia*, a native of Europe and western Siberia (Pimenov 2018). Although it shares the character of 3-winged mericarps, *Selinum* differs from *Conioselinum* in having pubescent/scabrous rays (Tutin et al. 1968) and narrower, more tightly clasping

upper leaf sheaths (Reduron 2018). Despite their close resemblance, Downie et al, (2010) found the two not to be closely related. The different clades to which they belong are in a large polytomy in the crown group of Apiaceae subfamily Apioideae (Downie et al. 2010).

Selinum carvifolia has only twice been reported for North America. The first report was of a 1908 collection that was stated (Knowlton & Deane 1922) to have been made at a vacant lot in Boston, MA; however, a specimen supporting that record has not been seen, and a recent search on various portals of herbarium databases (CNH, SERNEC, SEINet) has failed to locate such a specimen. The second report is current, from Tompkins Co., New York (Werier 2017), where the population is said to be “maintaining itself.” It is a perennial herb (Tutin 1980) but its persistence in Vermont since 2014 is not known.

7. *Torilis japonica* (Houtt.) DC., Prodr. 4: 219. 1830. Japanese or erect hedge-parsley.

Bennington Co: Pownal, North Pownal, seasonally saturated floor of former quarry, 17 Jul 2018, *Standley s.n.* (NEBC-01621348); North Pownal, Quarry Hill, along trail to quarry at bottom of hill, 17 Jul 2018, *Grunden* (MAINE); Adjacent to Rte. 346, 42.792149 -73.255396, WGS84, 75-100 individuals, occasional along paths and in understory below old limestone quarry (Nature Conservancy property), 31 Jul 2018, *Doucette 07311801* (VT); Adjacent to Rte. 346, 42.792390, -73.255005, WGS84, 75-100 individuals, occasional along paths and in understory below old limestone quarry (Nature Conservancy property), 31 Jul 2018, *Doucette 07311802* (VT); Adjacent to Rte. 346, 42.792360, -73.254073, WGS84, 75-100 individuals, occasional along paths and in understory below old limestone quarry (Nature Conservancy property), 31 Jul 2018, *Doucette 07311803* (VT); Adjacent to Rte. 346, 42.792348, -73.255891, WGS84, 75-100 individuals, occasional along paths and in understory below old limestone quarry (Nature Conservancy property), 31 Jul 2018, *Doucette 07311804* (VT). **Windsor Co:** Hartland, disturbed forest edge along Eastman Road above US Rte. 5, small colony of 5 fruiting plants and dozens of vegetative rosettes, 30 Sep 2019, *Peters s.n.* (VT).

This species was first introduced into North America in 1917 and, following a lag of nearly a century, has recently raised concern as an invasive species (DiTomasso et al. 2014), at least in the northeastern and north central United States, and southern Canada. It is similar in ecology to another non-native member of Apiaceae, *Anthriscus sylvestris* (L.) Hoffm., that has spread rapidly throughout much of Vermont as a roadside weed and adjacent fields and forest margins. It is, however, readily distinguished morphologically from that species by its solid stems, spinulose mericarps, and later, midsummer, bloom. In England, where both are native, *Torilis japonica* is said to be the most common, summer-flowering roadside umbellifer, and *Anthriscus sylvestris* the most common early-flowering one (Tutin 1980).

ARACEAE

8. *Wolffia brasiliensis* Wedd., Ann. Sci. Nat., Bot., sér. 3, 12(3): 170, t. 8 f. 1–23. 1849. Brazilian water-meal.

Windham Co: Vernon, Connecticut River shore, extensive mixed colonies with *W. borealis* in shallow water with abundant floating wrack and debris at portage trail just above Vernon Dam, 31 Oct 2016, *Peters s.n.* (VT).

Wolffia brasiliensis, originally described from Brazil, was long known in North America under its synonym *W. punctata* Grisebach (Landolt 1986). It occurs more or less throughout the eastern portion of the United States and has been known from the Connecticut River in neighboring Massachusetts since the 1970's (CNH 2019).

As a genus, *Wolffia* has been slowly colonizing western Vermont for nearly a century. *Wolffia columbiana* was first documented in southern Lake Champlain in 1929 (*Muenschler, Manning and Maguire No. 306*, VT-050629, VT-050631) and has now spread throughout that system and other waterbodies in western Vermont. It is now considered invasive in Europe, where it appears to be impacting indigenous *W. arrhiza* (L.) Horkel (Schmitz et al. 2014; Verloove 2019). *Wolffia borealis* (Engel.) Landolt & Wildi has been known since ca. 1980 (including the Zika specimens discussed below) and it, too, is present more or less throughout the Champlain Valley. Given this pattern, the discovery of a third watermeal, *W. brasiliensis*, in the Connecticut River, not far north of known populations in the same river system in Massachusetts was to be expected. Its presence is likely due to a natural range expansion, perhaps with waterfowl as vectors.

This taxon was not treated in the New Flora of Vermont (Gilman 2015) as a member of the flora or as an exclusion, and this lapse is here corrected. It had been mapped by Angelo and Boufford (2000) for Vermont: Bennington County and, in turn, this report was the basis for Vermont's inclusion on the Biota of North America (BONAP) county-distribution map of the species (Kartesz 2014). The underlying basis of the report was a collection made in 1980 by Peter Zika, labeled as *W. punctata* (a synonym of *W. brasiliensis*) from Bennington Co: Manchester, Zika 2276 (VT-050637, MASS-00339969, MASS-00339970). The specimen of Zika 2276 at VT was reexamined—the fronds re-wetted and viewed under a 20× dissecting scope—and determined to be *W. borealis*, with fronds clearly plane across the upper surface. *Wolffia borealis* was also long known, mistakenly, as *W. punctata* (Landolt 1986), the likely source of the error.

ARALIACEAE

9. *Eleutherococcus sieboldianus* (Makino) Koidz., *Acta Phytotax. Geobot.* 8(1): 52. 1939. Five-leaved aralia.

Windham Co: Dummerston, [518] Kipling Road, May 2018, *Guenther s.n.* (VT).

Introduced from Japan for ornament, this is now sparingly escaped in southern New England (Haines 2011; Cullina et al. 2011) and, in particular, there are several specimens in regional herbaria from the Connecticut River valley in Massachusetts (CNH 2019). It is shrubby, with palmately 5-divided leaves and is overall somewhat reminiscent of the popular 7–9 leaflet houseplant, *Schefflera arboricola* (Hayata) Kanehira, differing by being cold-hardy and by having somewhat thorny stems. Another species, *E. senticosus* (Rupr.) Maxim, is named “Siberian ginseng,” implying a relation of this genus to ginseng, *Panax* L. but, although close, the two are not in sister clades (Kim et al. 2017).

ASTERACEAE

10. *Inula racemosa* Hook. f., *Fl. Brit. India* 3(8): 292. 1881. Himalayan elecampane.

Caledonia Co: Hardwick, Hardwick Farms Road, escaped from cultivation to margins of corn (maize) fields and ditches, Hardwick Farms property. Stated by landowner to have been planted from seed acquired from the Royal Horticultural Society (Wisley) ca. 25 years previous but spreading (by seed) over distances 150m to farmland and said to be grazed by (Jersey) cows, 30 Sep 2017, *Gilman 17137* & *J. Laggis* (VT-289445, NEBC). **Washington Co:** Marshfield, Hollister Hill Road, near parking area for Stranahan Town Forest, but well removed from and across the road from a possible garden source, small group, several plants, rough ground, thick pasture, 12 Oct 2019, *Gilman 19060* (VT).

Himalayan elecampane is here reported as new to North America. *Inula racemosa* is a striking plant: tall (to 2m), with large, felted leaves, and a strictly erect, many-flowered racemiform capitulescence (occasionally with short, ascending, few-flowered branches) of large (5 cm) yellow-ayed capitula. The foliage and flowers are nearly identical to those of common elecampane (*Inula*

helenium L.), also non-native, which is moderately common in damp pastures and fields throughout Vermont, but that species has a few-flowered, broadly paniculiform capitulescence.

The collections cited are obvious escapes from ornamental horticulture, the first from a known seed source and the second from a nearby, but hardly adjacent, garden. This second population was first brought to the senior author's attention via a posting on *iNaturalist* by local resident Erika Mitchell (*iNaturalist* 2019).

The species is originally from the western Himalayas at altitudes of 1525m–2750m (Hooker 1881), but its introduction to North America is via Europe (England). Based on observation of these local populations, its ease of dispersal by windblown achenes with long pappi, and the widespread presence of the similar *Inula helenium* in New England, it seems likely that this is potentially an invasive species. It has also been reported as an overlooked, potentially invasive plant in Belgium (Verloove 2008).

11. *Liatris pycnostachya* Michx, Fl. Bor.-Amer. 2: 91. 1803. Prairie blazing-star.

Caledonia Co: Burke, pipeline corridor at summit, toward Victory, only one plant, 3 Sep 2017, *Gilman 17087* (VT). **Windsor Co:** Rochester, NAD83 N 44.868414/E-72.880787 +/-30m, north shoulder of Camp Brook Rd just south of wet road ditch and wet meadow on dryer shoulder, in open field at Riley Bostwick WMA, east of the brook crossing at the big dip in the road, just one roadside plant in flower, likely arrived by seed from a garden in the area—probably via a vehicle or wind, 19 Aug 2019, *Marcus s.n.* (VT).

This is an easily grown garden perennial and relatively popular in horticulture. Generally a species of the midwest and middle south, it is also known as a garden escape from other eastern states (Nesom 2006; Haines 2011). Its pappose achenes are readily wind-dispersed. The specimens reported here were of single individuals, confirming their status as waifs; another such plant observed in Essex County persisted three years and then vanished (Gilman, pers. obs.). We feel reporting of such waifs is justified, even if the plants are transient and no populations are formed, for sake of completeness and alignment with herbarium databases (see *Kummerowia*, below, also a waif). It is possible that, in the future, populations may become established and, if so, these first reports will be useful.

12. *Petasites japonicus* (Sieb. & Zucch.) Maxim., Award 34th Demidov. Prize 212 1866. Japanese sweet-colt's-foot.

Chittenden Co: Burlington, forested seasonal drainage way, wet area SW of 71 Little Eagle Bay, 29 Apr 2016, *Kruesi* (VT).

Originally from East Asia, and introduced to Vermont (likely via Europe, as many horticultural plants have been) this species has been occasionally grown, especially since the 1990's (K. Kruesi, pers. comm. to Marcus) for ornament or interest due to its very large, boldly architectural foliage. In gardens, it can spread aggressively, and it appears to be incipiently invasive (VT Invasives 2019). Various unvouchered reports have been made on websites, e. g. from Windsor Co: Woodstock (The Vermont Journal 2019). There were, as of 30 December 2019, nine Vermont observations of this species posted in the citizen-scientist website *iNaturalist* (2019) although it is unclear if some are from garden settings. Habitats generally appear to be in wet soil in seeps and along ditches, streams and rivers. Spread appears (to date) to be primarily vegetative—anecdotally, it is considered by those with experience in cultivating it to be a very aggressive, “impossible to control” spreader. As noted by Gilman (2016), collection of vouchers of invasive species often lags well behind the actual invasion.

13. *Verbesina alternifolia* (L.) Britton ex Kearney, Bull. Torrey Bot. Club 20(12): 485. 1893. Wingstem.

Windsor Co: Bethel, large patches along road and spreading widely into horse pasture, River Road (Finlay Bridge Road), not far S of Randolph town line, 5 Sep 2016, *Gilman 16102* (VT-289447, NEBC).

Wingstem occurs throughout the Midwest and the interior eastern United States as far north as New York (Kartesz 2014), where it is of unknown nativity (Werier 2017). In New England it is known only from Massachusetts, where it is not considered indigenous (Cullina et al. 2011; Haines 2011). Here, this population seems to have been introduced horticulturally but has spread into a neighboring field and also some distance along the local, unpaved road. Wingstem has not been suggested to have invasive potential.

14. *Vernonia noveboracensis* (L.) Michx., Fl. Bor.-Amer. 2: 95. 1803. New York ironweed.

Chittenden Co: Shelburne, ca. 10 clumps, stout, on semi-managed utility corridor (buried electric and sewer), suburban area, E side RR tracks, between tracks and forest patch, just S of Clearwater Road, 6 Sep 2018, *Gilman 18066* (VT, NEBC).

New York ironweed is indigenous in neighboring New York and Massachusetts. It is locally somewhat popular in horticulture, so it is unsurprising that it should be a casual escape. At the cited location, it was out of sight of houses and the population was scattered. Plants were typically robust, to 2m tall.

CARYOPHYLLACEAE

15. *Paronychia fastigiata* (Raf.) Fern. var. *fastigiata*, Rhodora 38: 421. 1936. Hairy forked whitlow-wort.

Windham Co: Wilmington, gravel parking lots and road margins around the maintenance shop at the Hermitage ski resort, 18 Sep 2016, *Peters s.n.* (VT-288392).

This species, native to North America, is apparently only adventive to Vermont, the current population perhaps brought in by earth-moving equipment or in the gravel itself. An earlier report (Angelo & Boufford 2012) from Addison County, was likely based on a specimen collected in 2001 in Addison Co: Middlebury (*A. Turner A701-104* & *W. Brumback*, VT-063137). That collection was noted in the New Flora (Gilman 2015) as missing but is now in the proper folder at VT. It was re-examined for this effort and determined to be a non-flowering specimen of *Moehringia lateriflora* (L.) Fenzl, so the report is herein excluded. The current collection is of the typical variety, characterized by straight styles and short (<0.15 mm) tips (“cusps”) of the sepals.

CYPERACEAE

16. *Cyperus erythrorhizos* Muhl., Descr. Gram. 20. 1817. Redroot flatsedge.

Addison Co: Cornwall, Lemon Fair River, large and vigorous fruiting plants up to 0.5m tall on silty clay river shore, 9 Oct 2014, *Engstrom s.n.* (VT). **Chittenden Co:** Burlington, Elks Club Beach near Lone Rock Point, lake sand beach, upper and mid-level strand lines of annual plant growth in low lake level summers, 5 Sep 2018, *Kruesi 202* (VT-290708). Charlotte, Converse Bay, drawn down sand beach, Oct 2016, *Marshall s.n.* (VT). Colchester, Delta Park, shore of Lake Champlain, 5 Oct 2016, *Marcus s.n.* (VT); same, 5 Oct 2016, *Gilman 16113* & *Flora Advisory Group* (VT-289467). Shelburne, Shelburne Town Beach, wet sand, full sun, 44°21'43”N, 73°15'60”W, 29 Sep 2016, *Sopher 70* (VT-289238). South Burlington, Queen City Park, shore of Lake Champlain, 8 Oct 2019, *Peters s.n.* (VT). Winooski, Winooski River, north shore, Salmon Hole, on drawn down sands, 25 Sep 2017, *Marcus s.n.*

(VT). **Grand Isle Co:** South Hero, dunes, 18 Oct 2016, *Popp 2606* (VT). **Windham Co:** Vernon, Connecticut River shore, on sand/gravel bars in drawdown zone just above and below Vernon Dam, 18 Oct 2016, *Peters s.n.* (VT). **Windsor Co.:** Bethel, [2nd Branch White River], just N of Findlay Bridge, occasional on exposed gravel bar, 5 Sep 2017, *Gilman 16098* (VT-289466).

This common flatsedge of eastern North America was first reported, with photos, as an unidentified *Cyperus* on the citizen-scientist website, iNaturalist.org, from two sites in Addison County, first by Charlie Hohn (iNaturalist 2012) and second by Susan Elliott (iNaturalist 2013). However, the species was not identified or vouchered in Vermont until a third site was discovered by Engstrom in Addison County in 2014. It was collected shortly thereafter in Chittenden, Grand Isle, Windham, and Windsor Counties. It was previously known in the surrounding states (Tucker 2002) and was first found in neighboring Quebec in 2007 (*Sabourin & Lavoie 2817*, MT-00023146).

In October 2016, the water level on Lake Champlain (93.75 ft.; <https://nwis/waterdata.usgs.gov>) was well below its ordinary low level (94.46 ft., Morgan 2014) and nearly two feet below its mean elevation (95.63 ft., Murphy 2014). A field trip was organized by Vermont's Scientific Advisory Group – Flora (which is advisory to Vermont's Endangered Species Committee) to the exposed beaches at Delta Park, on the shore of Lake Champlain at the mouth of the Winooski River, Colchester, for the purpose of observing rare littoral species such as *Eleocharis diandra* C. Wright, *Sparganium androcladum* Morong and *Cyperus diandrus* Torr. On that trip, *Cyperus erythrorhizos* was observed to be abundant on saturated but exposed gravelly sand and sandy silt beaches. That it was found at many widely distant sites within a short period of time—and is quite conspicuous—is (at least in part) an example of “plant blindness” (Wandersee and Schussler 2001).

FABACEAE

17. *Kummerowia striata* (Thunb.) Schindl., Repert. Spec. Nov. Regni Veg. 10(257/259): 403: 1912. Japanese-clover.

Windham Co: Vernon, Connecticut River shore, one single plant growing on exposed shore/beach at public water access just below the Vernon Dam, 18 Oct 2016, *M. Peters s.n.* (VT-228936).

Japanese-clover was introduced into North America from Asia, and has been extensively cultivated, especially in the southeastern United States where it is “ubiquitously established” (Isely 1998) and where it has caused some concern as an invasive species (Gucker 2010). Its mode of introduction to Vermont is unknown.

The genus *Kummerowia* Schindl. has recently been considered sister to *Lespedeza* Michx. (Xu et al. 2012), with which it shares a one-seeded loment and leaves with 3 leaflets, but from which it differs in prominent, striate stipules, annual habit, and flowers inserted singly. However, it was earlier treated in North American literature (e.g. Fernald 1950) as *Lespedeza striata* (Thunb.) Hook. & Arnott, and botanists have struggled to find its relationships; the taxonomic history of its tribe, Desmodieae (Benth.) Hutchinson, is complex. This history was summarized by Ohashi and Nemoto (2014), who also recognized it as sister to *Lespedeza*. A recent molecular study (Jabbour et al. 2018), however, suggests that the genus is nested within *Lespedeza*, in which case the name of our species would be *Lespedeza striata* (Thunb.) Hook. & Arnott.

GERANIACEAE

18. *Geranium sibiricum* L., Sp. Pl. 2: 263. 1753. Siberian crane's-bill.

Franklin Co: Highgate, hedgerow at edge of sandy lawn, does not appear cultivated, Lamoille Valley Rail Trail, E of Vt. Rte. 105, just E of village, 5 Oct 2018, *Gilman 18065* (VT, NEBC).

Eurasian in origin, Siberian crane's-bill has been known in North America at least since the late 19th century, either as a naturalized plant (Watson & Coulter 1890) or as an adventive (Britton and Brown 1897). It is known from several northeastern states (Aedo 2012; Kartesz 2014) and has recently been found in Québec (Blondeau 2015). The current population, although near a lawn, was in a rail-trail corridor and did not appear to have been cultivated; it formed a large patch. Individual stems in this collection are slightly atypical with 2 flowers, not one, on each pedicel, a character stated (Xu and Aedo 2008, Aedo 2012) to occur on occasion.

LAMIACEAE

19. *Lycopus europaeus* L., Sp. Pl. 1: 21. 1753. European water horehound.

Chittenden Co: Burlington, Starr Farm beach, wet area (rill) at top of beach, 18 Oct 2018, *Gilman 18097* (VT). Shelburne, occasional on shoreline of the LaPlatte River at Shelburne Falls, 4 Sep 2018, *Gilman 18057* (VT); bank of the LaPlatte River, W of the RR tracks W of US Rte. 7, 5 Sep 2018, *Gilman 18058* (VT).

European water-horehound has invaded shores and waterways in eastern North America since the 1860's, with a rather rapid invasion along the St. Lawrence River downriver of Lake Ontario since the 1960's (Stuckey & Phillips 1970). A horse-collar shaped ring of corky tissue around the crest of the nutlet is a flotation device that adapts the species to rapid water-borne dispersal (Moon and Hong 2006). Delisle et al. (2003) indicated that, in Québec, the spread was "almost exclusively along the course of the St. Lawrence River" and estimated a colonization rate of ca. 45 km/year. Given that there is often a significant lag time between colonization and discovery of a colonizing species, it is likely that this species now occurs, or will soon occur, throughout Lake Champlain and its environs.

20. *Mentha aquatica* L. var. *citrata* (Ehrh.) W.C. Werner, Bull. Techn. Serv. Ohio Agric. Exp. Sta. 1(3): 239. 1893. Water mint, orange mint, bergamot mint.

Washington Co: Calais, Worcester Road, Curtis Pond fishing access area, 12 Aug 2017 [flowers] & 18 Oct 2017 [fruit], *Gilman 17067* (VT, NEBC).

A previous report of *Mentha citrata* (Atwood et al. 1973) from Bennington County was based on two non-flowering specimens from North Dorset, collected by N.F. Flynn on 27 May 1900 (VT-126881) and on 27 Aug 1900 (VT-126882). The first is apparently a seedling and the second is a stoloniferous shoot. These specimens cannot be confidently identified. A second report by Atwood et al. (1973), from Windsor County, was based on a specimen from Bethel collected as *M. spicata* L. by P. Spalding without recognizable date (NEBC-00573346), and later annotated by F.C. Seymour as *M. citrata* Ehrh.; this specimen was still later annotated by H. Ahles as *M. piperita* and is currently filed as such. No specimen has been seen to support a third report by Atwood et al. (1973) from Franklin County. A fourth report, from Lamoille County, underpinned by another specimen at VT, collected at the Trapp Family Lodge in Stowe by M.R. Carse on 16 Sep 1971 (VT-126880) was possibly from cultivation from the well-known and rather extensive gardens at that resort.

The Calais population is extensive and robust, occurring in a damp but not marshy area near Curtis Pond. Plants have a distinctive strong scent that is faintly citrusy and faintly spicy, as implied by both its common and scientific names. The exact taxonomic placement of this plant is uncertain. Originally described as a species, it has been widely treated as a variety of *M. aquatica* but according to Harley (2015) it may have arisen as a hybrid between an unusual fertile form *M. aquatica* and *M. spicata* (spearmint), resulting in a sterile *M. ×piperita* L. var. *citrata* (Ehrh.) Briq. Like other sterile mints on the Vermont landscape, it is likely an introduction from Great Britain.

21. *Mentha longifolia* (L.) L., Amoen. Acad. Linnaeus ed. 4: 485. 1759. Horse mint.

Washington Co: Barre, Lower Usle Road, ditch between two abandoned farm fields (becoming residential area), 11 Aug 2017, *Gilman 17066* (VT).

Mentha longifolia is easily mistaken for pubescent forms of spearmint, *M. spicata* L. (Tucker & Fairbrothers 2000; Tucker 2014), of which it is a progenitor, but identification of the current collection as *M. longifolia* is confirmed by its sessile, lanceolate-oblong, non-rugose leaves with sharp, spreading-arching teeth, by its abundant silvery, unbranched pubescence, and by its short anthers (Šarić-Kundalić et al. 2009). Specimens are a good match for the lectotype specimen chosen and illustrated by Tucker et al. (1980) and key out to *M. longifolia* in the keys provided by Harley (1972), Haines (2011) and Tucker (2014). Furthermore, although Tucker et al. (2005) found that *M. longifolia* may rarely have the characteristic aroma of *M. spicata*, the current population lacks it and is musty-scented with a hint of peppermint, as described by Tucker (2014) for *M. longifolia*. It is also noteworthy that pubescence has been selected against in the cultivated history of spearmint (Voss 1996; Harley 2016) and pubescent forms of spearmint are very rare in Vermont (Gilman, pers. obs.).

This species was likely introduced for cultivation from Europe; only one large clump, was observed. It is a fertile, diploid species, and may be anticipated to spread by seed.

ONAGRACEAE

22. *Oenothera clelandii* Dietrich, Raven, & Wagner, Ann. Missouri Bot. Gard. 70(1): 196. 1983. Cleland's evening primrose.

Chittenden Co: Milton, > 200 individuals, in two separate subpopulations; dry sand in sunny, open borrow area between US Rte. 7 and I-89 at near Checkerberry Corner, 5 Oct 2018, *Gilman 18093* & *Briggs* (VT, NEBC).

Native to the Midwest, Dietrich and Wagner (1988) considered that populations from eastern states east of Michigan “may represent introductions” and it was treated as non-native in New York (“plants that occur or occurred ... only as the result of human assistance”) by Werier (2017). This seems the best interpretation for Vermont as well, given the habitat of the current population in a sandy, relatively recent borrow area. Sandy soils are extensive in the Milton area and several regionally common psammophilous species co-occur, including *Cyperus lupulinus* (Spreng.) Marcks, *Dichanthelium columbianum* (Scribn.) Freckmann, *Lechea intermedia* Legg. ex Britton, and *Trichostema dichotomum* L., but this species has not been previously observed elsewhere in the region.

PAPAVERACEAE

23. *Hylomecon japonica* (Thunb.) Prantl ex Engler & Prantl, Nat. Pflanzenfam. 3(2): 139. 1889. Forest-poppy.

Washington Co: Montpelier, W side of North St. heading out of town near where the bike trail starts, NAD83 N44.270394/E-72.561795+/300m down the road. One large clumped herbaceous patch on edge of street, and 1 large clump about 20ft west in woods. Plants are prominent in flower, and no more seen from the road. Probably a very new garden escape. Houses are nearby, but all on the other side of the road, so clearly now wild. 2 Jun 2017, *Marcus s.n.* (VT).

Forest poppy is native to China, Japan, Korea, and Russia (Siberia); see Zhang & Grey-Wilson (2008) for a technical description. It is an early-spring bloomer with single (4-petal) yellow flowers and is occasionally cultivated, especially by rock-gardeners and connoisseurs of difficult-to-obtain perennials (D. Avery, Cady's Falls Nursery, pers. comm to Gilman). This record documents a small but apparently persistent escape from horticulture; the specimen comports with the description of the

typical variety, with the basal leaf lobes biserrate rather than deeply incised or lobed. It is apparently new to North America as a wilding.

PHRYMACEAE

24. *Erythranthe guttata* (Fisch. ex DC.) Nesom, *Phytoneuron* 2012–39: 43. 2012. Yellow monkey-flower.

Washington Co: Middlesex, Wrightsville Dam State Recreation Area, Shady Rill town picnic area off Shady Rill Road, in a forested seep with *Juncus ensifolius*, with no recent signs of disturbance or horticulture, 660 ft elevation, 7 Jul 2018, *Marcus s.n.* (VT). **Windsor Co.:** Reading, no date [prior to 1915], [*P. W.*] *Whiting* (VT ex Hartland Nature Club).

A species of the American West, *Erythranthe guttata* is known in several locations in the northeastern USA (e.g., Haines 2011; Werier 2017). The Windsor County specimen was reported (as *Mimulus guttatus*) by Eggleston et al. (1915) and Dole (1937), but knowledge of this voucher was subsequently lost to later authors (Seymour 1969; Gilman 2015). It resurfaced when the herbarium of the Hartland Nature Club (located in Hartland, Windsor County) was donated to the University of Vermont, where it is now incorporated with the Pringle Herbarium. With this rediscovery, yellow monkey-flower is readmitted to the flora of Vermont.

Recently, a collection has been made from a substantial, well established population in Washington County, where a colony was established in a forest seep near a public picnic area. No mode of introduction is known for either collection but, over time, yellow monkey-flower has been grown for ornament in public and private gardens more or less worldwide, and seeds are widely available for purchase. The Washington County collection has been identified as the species in the strict sense (G. Nesom, pers. comm. to A. Marcus).

POLYGALACEAE

25. *Polygala vulgaris* L., *Sp. Pl.* 2: 702. 1753. Common milkwort.

Franklin Co: Fairfield, near Ridge Road, small group in mowed path through old field, mesic, 23 Jun 2019, *Dodge s.n.* (VT); 25 Jun 2019, *Gilman s.n.* & *Dodge* (NEBC).

Common milkwort (type of the genus *Polygala*) is a relatively common species in Europe, where it grows in grassy swards (McNeill 1968). It is said (McNeill 1968; Stace 2019) to be extremely variable as to flower color with white, pink, reddish, or blue flowers. The current population is growing among rather dense grasses in an old pasture or hayfield; flowers are a vivid, deep blue (Gilman, pers. obs.).

A relatively small, slender plant, common milkwort is a short-lived perennial and (at least in Europe) is dispersed by ants (Lack and Kay 1987). It is known as a sporadic introduction in North America from British Columbia (CPNH 2019), Michigan, (Voss 1985), WA (CPNH 2019), Oregon (CPNH, 2019) and California (SERNEC). Voss (1985) indicated that its presence was “undoubtedly an escape from cultivation” but it is not clear how the Vermont population was established. Its discoverer, Michael Dodge, is originally from England, but has long been a resident of Vermont. He operates a small nursery specializing in willows (*Salix* spp.), but the population is on a neighboring property.

POLYGONACEAE

26. *Rumex pseudonatronatus* (Borbás) Borbás ex Murbeck, *Bot. Not.* 1899: 16. 1899. Finnish dock.

Franklin Co: Swanton, Tabor Road, Missisquoi National Wildlife Refuge, tall plants in field, near parking, 26 Aug 2018 & 8 Sep 2018, *Gilman 18055* (VT, NY). **Fairfax:** Tall plants in dry, sandy

field, corner Vt. Rte. 104 and Sand Hill Road, 8 Sep 2018, *Gilman 18064* (VT, NEBC). **Chittenden Co.:** South Burlington: City of S. Burlington property S of Nowland Farm Road, common in field, 9 Oct 2018, *Gilman 18101* (VT, NEBC).

Finnish dock is a non-native European weed that is common in Canada in the Prairie Provinces (Mosyakin 2005). It appears to have spread into northwestern Vermont from adjacent Québec, where it was first documented a few years before being found in Vermont (Lavoie et al. 2012, CNH 2019). In Vermont it occurs as a scattered weed of old, seldom-mowed fields. Seed is abundantly produced and its biology is likely similar to that of other European docks that are common in the agricultural and roadside landscape in Vermont, e.g. *Rumex crispus* L., *R. longifolius* DC., and *R. obtusifolius* L., and it seems to be an increasing element of the landscape, at least in the northern Champlain Valley. It can be identified by its tall (1.5m), erect flowering/fruitlet stem with relatively short, spreading to ascending, mostly distal branches, and relatively small, orbicular, entire outer tepals that lack tubercles. Plants are usually single-stemmed and do not form large clumps, and the branching pattern—the side branches are quite short and spreading—is quite distinctive.

RANUNCULACEAE

27. *Myosurus minimus* L., Sp. Pl. 1: 284. 1753. Tiny mousetail.

Windham Co: Dummerston, 500-1000 plants, NE corner of town in cornfield behind Soundview Paper Co. on way to Dummerston Landing, 13 May 2018, *Anderson s.n.* (VT).

Myosurus has a more or less circum-temperate distribution and is native in much of North America, especially in the western regions (Whittemore 1997). It is a rare weed in New England, known to date from a single collection from 1988 in Bristol County, Massachusetts (*Sorrie 4179*, GH-0643952), where it was stated to occur in a fallow field with “clayey, raw soil.” Soils in the field noted on the collection label of the current record are mapped by USDA NRCS (2014) as silt loams, and the site may be subject to inundation by the nearby Connecticut River. Its ecology as a short-lived, early season annual, lends itself to weediness in certain conditions and in some areas it is a weed in agriculture, especially on damp soils (e.g., Fishel et al. 2000). Its presence in Vermont is likely a result of agriculture but its future under current management regimes is unknown.

SALICACEAE

28. *Salix serissima* (Bailey) Fern., Rhodora 6: 6–7. 1903. Autumn willow.

Addison Co: Cornwall, Cornwall Swamp, a few ~2m tall plants in small openings in the middle of the swamp, with mixed canopy of *Thuja occidentalis*, *Acer rubrum*, *Picea mariana* and scattered supercanopy of *Pinus strobus*, hummocky ground, 16 Jun 2016, *Engstrom s.n.* (VT). **Bennington Co.:** Pownal, White Oaks fen, W of White Oaks Road, rich fen with *Carex schweinitzii*, 29 May 2019, *Marcus s.n.* (VT).

Following long-standing but erroneous reports, as detailed below, autumn willow has been identified in two Vermont locations, both in calcareous fen/swamp habitats similar to those described for the species in western Massachusetts (Sorrie 1987). The first Addison County population was first discovered and photographed by Engstrom on 11 September 2014; his 16 June 2016 collection is from a male clone and includes remnant staminate aments.

Autumn willow has been reported or mapped from Vermont in several publications (Dole 1937; Seymour 1969; Atwood et al 1973; Argus 2007, 2010; USDA 2019) but historical reports have been in error. Most reports have been based on two collections. The first was made in 1920 by C.H. Knowlton from Bennington Co: Arlington (NEBC-00653895). Jenkins and Zika (1995) considered this specimen inadequate for determination but North American *Salix* specialist George Argus later (1997) annotated

it as *Salix lucida* Muhl.; an unannotated duplicate is at the Deam Herbarium, Indiana University (IND-0071490) (CNH 2019). The second collection, reported by Seymour 1969 and Atwood et al. 1973, was made by E. Anderson et al. in Orange Co.: Corinth in 1933. Jenkins and Zika (1995) were unable to locate that specimen, which at the time of their research was perhaps on loan to Argus. A sheet of that collection is now at NEBC (00653880) and it, too, has been annotated (1997) by Argus as *S. lucida*. Jenkins and Zika (1995) also determined mislabeled specimens from Franklin County (*no collector cited*, HNH) and Orleans County (*Churchill*, HNH) as *S. lucida*.

Despite the frequent misidentification of *Salix lucida* as *S. serissima*, and although they may often share the same habitat, the two species differ in numerous characters as detailed by Fernald (1904) and by Argus (2010). Additional characters of the buds, bud scales, and cataphylls are provided by Zinovjev (2010). The misidentifications perhaps had their basis in the fact that *serissima* was first described as a variety of *S. lucida* (Bailey 1887) and that Fernald (1904) suggested, “it might be sought with some confidence in Bennington Co., Vermont.” The shininess and shape of the leaves of the two species are similar but not identical. The leaves of *S. serissima* are less shiny than those of *S. lucida*, and they are less acuminate than those of *S. lucida*, as illustrated by Argus (2010).

ADDITIONS FIRST REPORTED ELSEWHERE

Coursol (2007) reported *Lycopus laurentianus* Rolland-Germain from northern Lake Champlain in Vermont, as well as neighboring Québec and New York. This taxon was previously thought to have been endemic to shoreline habitats along the St. Lawrence River, and the Lake Champlain populations are among the first reported in the United States (in the same paper, Coursol also reported it from Maine). It differs from *L. americanus* Muhl. especially in the collar of spongy tissue that more or less rings the adaxial face of the nutlet which, in *L. laurentianus*, is reduced to a narrow rim, as well as characters of the leaf and the stem. Coursol and co-investigator S. Bailleul annotated specimens (at MT and VT) from Franklin, Grand Isle, and Chittenden Counties.

Pace and Cameron (2017) revised the *Spiranthes cernua* L. complex, adding two species to the state of Vermont, the newly described *Spiranthes arcisepala* M.C. Pace and the newly recognized *Spiranthes incurva* (Jenn.) M.C. Pace. At the same time, they excluded *Spiranthes cernua* s.s. from Vermont. *Spiranthes arcisepala* is similar to *S. cernua* and differs in several cryptic features including downward-arching sepals; specimens were cited from Franklin and Bennington Counties. *Spiranthes incurva* is of hybrid origin, with *S. cernua* and *S. magnicamporum* Sheviak as progenitors; its lateral sepals are often ascending. Pace and Cameron (2017) cited specimens from Franklin, Orleans, Windham, and Windsor counties.

Patel et al. (2019) described a new species, *Phegopteris excelsior* Patel & Gilman, that may be relatively common in Vermont. This species is much like a very robust *P. connectilis* (Michx.) Watt in appearance, with some fronds equaling in size the large fronds of *P. hexagonoptera* Fée. First hypothesized by Mulligan et al. (1972) as a hybrid between apogamous triploid *P. connectilis* and sexual diploid *P. hexagonoptera*, it is an apogamous tetraploid. Patel et al. (2019) found that while it is of hybrid origin, *P. hexagonoptera* is not involved. Although *P. connectilis* is a likely progenitor, a second progenitor has not been identified. It occurs from Nova Scotia to New York and is a species of forested habitats, often near streams or near, but not within, wetlands. In Vermont, it is known from Orleans, Caledonia, Washington, and Bennington Counties.

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