

ADDITIONS TO THE NEW FLORA OF VERMONT — III.

ARTHUR V. GILMAN
Pringle Herbarium
University of Vermont
Burlington, Vermont
avgilman@together.net

ABSTRACT

This is the third in a series of addenda to the New Flora of Vermont. Two previous papers added one order (Buxales), one family (Buxaceae), 14 genera, 49 species, and 4 varieties to the flora of Vermont and noted the publication elsewhere of 6 species, 1 subspecies, and 4 varieties. The current effort adds 2 families (Clethraceae, Nelumbonaceae), 6 genera (*Carthamus*, *Chorispora*, *Clethra*, *Microthlaspi*, *Nelumbo*, and *Phellodendron*), 26 species, and 2 varieties to the flora of Vermont. These additions are in two categories: (1) newly arrived/first discovery — 17 species and 1 variety, and (2) resurrected from having been excluded in the New Flora — 9 species and 1 variety.

The format of entries is similar to that of the New Flora (Gilman 2015) and the first two lists of additions (Gilman 2016; Gilman et al. 2019). Each is supported by citation of one or more herbarium specimens at local and regional herbaria, save one, *Ribes rotundifolium* Michx., for which no collection was made by the discoverer. That addition is included only with photographic documentation by online *iNaturalist* Observations. *iNaturalist* Observations are listed for some other collections, especially if associated with those collections, with the caveat that the permanency of these Observations remains to be seen. Following this documentation, notes on the collections, history, origin, habitat, and biology of each addition are given as appropriate.

I. Newly arrived/first discovery

AMARANTHACEAE

1. ***Amaranthus emarginatus*** Salzman ex Uline & Bray in Bot. Gaz. 19: 319. 1894. Emarginate amaranth.
Amaranthus blitum subsp. *emarginatus* (Salz. ex Moq.) Carretero, Muñoz Garm. & Pedrol.
Amaranthus emarginatus subsp. *praegracilis* (Thell.) Hügin

Franklin Co.: St. Albans, St. Albans Bay, City Beach near east end, 18 Aug 2022, *Gilman* 22060 (NEBC, VT).

Newly arrived/first discovery. In 2021, a large population of this non-native amaranth, pantropical in origin, was found by Aaron Marcus (Vermont Department of Fish and Wildlife) on the upper margin of a sand beach on Lake Champlain exposed by dropping water levels. The population was again present in 2022 when the above-cited collection was made. It is here identified (with some hesitation) as the *emarginatus* element of the complex, based on relatively small fruits and seeds, a predominance of small axillary inflorescences, and the shoreline habitat emphasized for this taxon by Iamónico (2015). However, most plants had an ascending habit (no plants were completely prostrate), robust stems, and a thin (i.e., not “thick”) terminal inflorescence, characters that agree with descriptions of the *praegracilis* element.

Plants in the *Amaranthus blitum-emarginatus* complex are known in Canada in the upper St. Lawrence River valley south of Montreal (Costea & Tardif, 2003, fig. 9) and in New York state, mostly in the Lake Ontario watershed (Clemants 1992). Their recent appearance on Lake Champlain is not

surprising but the mode of introduction to this site is unknown. There are no evident seed or fruit characters that appear particularly adapted for water dispersal of *Amaranthus* seeds although it is noteworthy that other *Amaranthus* species also occur on shorelines, e.g., *A. tuberculatus* (Moq.) J.D. Sauer, which is also known from Lake Champlain, and *A. pumilus* Raf., a rare species of Atlantic beaches on the Eastern Seaboard.

ARALIACEAE

2. *Hydrocotyle sibthorpioides* Lam., Encycl. 3(1): 153. 1789. Lawn marsh-pennywort.

Chittenden Co.: Essex, Thompson Drive, large patch, 3'×10', mowed verge of sidewalk fronting undeveloped, forested lot, industrial park, 8 Jul 2022, *Gilman 22038* (NEBC, VT).

Newly arrived/first discovery. *Hydrocotyle* is a large genus of primarily wetland or aquatic plants with estimates varying from 130 (Nicolas & Plunkett 2009) to ca. 180 species (Plunkett et al. 2018), yet few are native in North America and only one, *H. americana* L., occurs in Vermont. *Hydrocotyle sibthorpioides* is from Asia and is reported as recently and rapidly increasing in lawns and waste areas in the southeastern United States (Weakley et al. 2022), extending as far north as Westchester Co., New York (Atha 2017). The current report is from a new lawn adjacent to a new sidewalk in a developing industrial park. Presumably, it was recently introduced with earth-moving equipment, topsoil, or grass seed. The site is not damp or wet, yet the clone was dense, to exclusion of clovers and lawn grasses. Lawn marsh-pennywort is recognized in comparison to indigenous *H. americana* by its elongate peduncles that expose the umbels well above the leaves.

ASTERACEAE

3. *Carthamus tinctorius* L., Sp. Pl. 2: 830. 1753. Safflower.

Windham Co.: One large plant, robust, crack in concrete sidewalk, Highlawn Street S of Western Avenue, Brattleboro, 7 Aug 2022, *Gilman 22051* (NEBC, VT).

Newly arrived/first discovery. Anciently domesticated in the Middle East as a dye or colorant (the word roots “tinct-” and “saff-” both refer to this feature), safflower is now more familiar as the source of cooking oil, a 20th-century innovation. It is a relatively minor agricultural crop with only 135,000 US acres cropped with it in 2021, primarily in the western states (NASS 2021) and it is not grown for grain in Vermont. The origin of this waif in Brattleboro is not known but was likely from casual use as birdseed. Safflower is available at local farm stores for this purpose and is readily available for purchase online. Although the seeds (i.e., cypselae) are quite large, several local birds that frequent feeders, e.g., cardinals and bluejays, eat them (Cornell Lab 2009). Weakley et al. (2022) indicated that it occurs “under bird feeders as a waif” in a few southeastern states.

4. *Eutrochium purpureum* (L.) E.E. Lamont var. *holzingeri* (Rydb.) E.E. Lamont, Sida 21: 902. 2004. Holzinger’s sweet Joe Pye weed.

Grand Isle Co.: South Hero, sunny powerline corridor a little west of East Shore Road; a number of clumps among tall vegetation [on] dry soil, 24 Sep & 8 Oct 2009, *Gilman 09168bis* (VT).

Newly arrived/first discovery. *Eutrochium purpureum* is an uncommon species in Vermont, occurring in the western and southern sections in dry, deciduous forests and margins. Its leaves are abaxially glabrate with, at most, light pubescence along veins. The population cited here, from a sunny powerline corridor on Grand Isle in northern Lake Champlain, has remarkably pubescent leaves. It comports well with the description of var. *holzingeri*, a variety that to date has only been recorded from regions near and west of the Mississippi River, more than 1000 miles from Vermont. Variation within this species (and genus) is extensive (Lamont 2006), so the Vermont plants noted here may represent

only a local *forma* or response to the sunny habitat rather than being a part of the presumably interbreeding population in the Midwest. However, long-distance dispersal of a wind-dispersed species eastward to a lowland, open, artificially maintained tall herb community is a possibility.

BRASSICACEAE

5. *Chorispora tenella* (Pall.) DC., Syst. Nat. 2: 435. 1821. Blue mustard.

Windham Co.: Dummerston, Dummerston Landing Road, cultivated field, corn (*Zea mays* L.) previous year, high terrace along Connecticut River between river and road/RR, 30 Apr 2022, Gilman, Anderson & Cooper (NEBC, VT).

Newly arrived/first discovery. The field where this was collected is the same one from which Gilman et al. (2020) reported *Myosurus minimus* L. (Ranunculaceae) and from which the following species, *Microthlaspi perfoliata*, is also newly reported. Recently, the field had been cropped annually to corn with a spring-till, fall-harvest regime and no winter cover crop. Presumably, summer weeds have been controlled with a pre-emergent herbicide such as atrazine, or post-emergents such as glyphosate (assuming the corn crop is genetically modified to be resistant, e.g., Roundup Ready® corn). Spring ephemeral weeds escape such a regime. All three of these spring annual weeds have been found across the center of the field — along with such others as *Arabidopsis thaliana*, *Capsella bursa-pastoris*, and *Viola arvensis* — and do not occur along field margins which, despite herbicides, support a typical summer weed-crop of *Chenopodium album*, *Amaranthus retroflexus*, and *Galinsoga parviflora*.

Chorispora is of Asian origin and was first observed in the USA in 1929 in Idaho (Lyon et al. 2006). It is now a very common weed in the western USA, and present in some northeastern states as well (Haines 2011; Kartez 2014; Werier 2017). It is unique among early spring mustards that occur in Vermont by its conspicuous pinkish blue flowers.

6. *Microthlaspi perfoliatum* (L.) F.K. Mey., Feddes Repert. 84: 453. 1973. Perfoliate penny-cress. ≡ *Noccaea perfoliata* (L.) Al-Shehbaz

Windham Co.: Dummerston, Dummerston Landing Road, cultivated field, corn (*Zea*) previous year, high terrace along Connecticut River between river and road/RR, with abundant *Arabidopsis thaliana*, *Draba verna*, *Capsella bursa-pastoris*, etc., 30 Apr 2022, Gilman, Anderson, & Cooper (NEBC, VT).

Newly arrived/first discovery. The field where this was collected is the same one from which *Chorispora tenella* and other weeds discussed above have been collected, and *Microthlaspi* shares the same life cycle as those: spring ephemerals on cultivated soil. The genus differs from *Thlaspi* in its early spring habit, smaller overall size, smaller fruits, and perfoliate leaves. There has been recent debate (Al-Shehbaz 2014; Ali et al. 2016; Neill & Kieschnick 2021) about whether this should properly be called *Microthlaspi* or *Noccaea*, and it appears consensus has not been reached. For that reason, both names are listed here.

CLETHRACEAE

7. *Clethra alnifolia* L., Sp. Pl. 1: 396. 1753. Sweet pepperbush.

Windham Co.: Brattleboro, Wantastegok, E side of Retreat Meadows, natural white pine–oak forest on steep bank at water's edge, N42.8635, E-72.5593, 15 Oct 2021, Marcus *s.n.* (VT).

Newly arrived/first discovery. *Clethra alnifolia* is very common in forested swamps and adjacent uplands in southern New England, and its northward spread in the Connecticut River Valley

was not unanticipated. Because it is occasionally used in horticulture there remains a possibility that the origin of this population is not natural. However, there is no particular reason to assume so. Note that the area (Wantastegok) is of significant Native American heritage.

This addition to the flora of Vermont also adds another family, Clethraceae, in the order Ericales (APG 2016). It is distinctive among New England shrubs in many features, not least its spicy-sweet, late summer blossoms on erect, elongate spikes. *Clethra* L. is a large genus of primarily tropical shrubs and trees, distributed in Southeast Asia, Central and South America, the Caribbean, and the southeastern United States. Such a bipolar distribution south of the temperate forests “is known for few other plant genera” (Schneider & Bayer 2004). *Clethra alnifolia*, with a distribution from Nova Scotia south and west to Texas, is an outlier, as is another species on Madeira.

ELATINACEAE

8. *Elatine triandra* Schkuhr, Bot. Handb. 1: 345–346, t. 109b, f.2, 1789. Eurasian waterwort.

Windham Co.: Vernon, occasional in patches 5–25 cm in diameter. In shallow water along the W shore of the Connecticut River 0.1 mi N of Vernon Dam, 4 Oct 1975, *Countryman 2763-10* (VT-082203, MASS-00310757, image!, NHA-514952, image!).

Newly arrived/first discovery. There has been significant clarification of North American *Elatine* in recent years (Rosman et al. 2016, Razifard et al. 2017, 2017b), including on the nature and distribution of *E. triandra*. The above cited specimen at MASS was annotated from *E. americana* (Pursh) Arnott by H. Razifard. According to Razifard (2016), the two species differ in leaf length to width ratio, with *E. americana* having slightly broader leaves (less than 2.5 times as long as wide) than *E. triandra* (more than 2.5 times as long as wide). Measurements of leaves on the specimen at VT (n=10) and on an image of the specimen at NHA (n=10) show an average length to width ratio of 3.6:1, clearly within the range of *E. triandra*. Razifard, however, notes (pers. comm.) that molecular confirmation is lacking for this collection. This species is introduced in North America (Razifard et al. 2016). It has recently been well documented in the Connecticut River just down-river in Franklin County, Mass. (Bertin et al. 2020).

ERICACEAE

9. *Rhododendron lapponicum* (L.) Wahlenb., Fl. Lapp. 104. 1812. Lapland rosebay.

Chittenden Co.: 29 Jul 2015, *Popp 2452 & Zaino* (VT).

Also see *iNaturalist* (Observation 118098121) of the same population.

Newly arrived/first discovery. The recent occurrence of Lapland rosebay in Vermont is somewhat puzzling, made even more so because it was found growing intimately with another rare species that was not historically known from this particular locality. Bob Popp (Vermont Department of Fish and Wildlife), who vouchered its presence, made a substantial effort to elucidate how both might have arrived—whether assisted in some manner or not. That effort failed to find any reason to conclude that these were anything other than naturally occurring events. Because the population is small and vulnerable, its location is here given only to county level.

Rhododendron lapponicum has a large, primarily subarctic and arctic range in North America, eastern Asia (Russian Siberia) and northwestern Europe (Scandinavia and Russia) (Hultén 1968). In Greenland it reaches 79° north (Rune 2011). In general, it is a species of open, rocky-peaty habitats north of, or elevationally above, treeline. Vermont is at its southern range limit and it also occurs in Maine, New Hampshire, and New York. Interestingly, a lowland population occurs on sandstone ledges along the Kickapoo River in the Driftless Area of Wisconsin (Read & Wizensinski 1978).

GERANIACEAE

- 10. *Geranium thunbergii*** Siebold ex Lindl. & Paxton, Paxt. Fl. Gard. 1(12): 186, f. 115. 1851. Japanese crane's-bill.

Orange Co.: Strafford, large spreading patches, edge of unpaved road and in field entrance, W side of Alger Road, 21 Aug 2021, *Gilman 21056* (VT). **Windsor Co.:** Thetford, 1978 Ascutney Road, escaped from cultivation, invasive, spreading through lawns and gardens, 7 Jul and 9 Sep 2020, *Norton s.n.* (VT). **Windham Co.:** Dummerston, shaded roadside thicket, 6 Aug 2022, *Anderson & Cooper* (VT).

See also several *iNaturalist* Observations (120485062 et al.) of the Windsor County population.

Newly arrived/first discovery. Originally from eastern Asia, Japanese crane's-bill has been sporadically reported from Massachusetts south to North Carolina (Haines 2011, Aedo 2012, Werier 2017). Fernald (1950) reported it, as *G. nepalense* var. *thunbergii*, from near Boston (Middlesex County) as a locally abundant garden weed.

Geranium thunbergii closely resembles *G. sibiricum* L., but more consistently has two flowers in each cymule, glandular hairs on the pedicels, and a somewhat more robust habit (Aedo 2012). Habitats in its natural range include "grassy places" (Ohwi 1965), "roadsides, meadows, and weedy areas" (Langran & Aedo 2008) and "waste grounds, weedy areas, rocky hillsides and open forests" (Aedo 2012). Its current habitats in Vermont are similar and all these populations are likely escapes from horticulture.

GROSSULARIACEAE

- 11. *Ribes rotundifolium*** Michx., Fl. Bor.-Amer. 1: 110–111. 1803. Appalachian gooseberry.

Rutland Co.: West Haven, single flowering shrub in fertile, dry, oak-hickory-hornbeam glades on the flat top of Austen [Austin] Hill, in Vermont near the E shore of Lake Champlain, 2 May 2021, *Jenkins*.

No specimens of this occurrence were collected due to its rarity, but the report is vouchered by the following Observations posted on the *iNaturalist* website with copies deposited at VT: 77161371, 77161376, 77161377, 77161381, 77161385, and 77161387.

Newly arrived/first discovery. The common name of Appalachian gooseberry is apt, as this species is mostly restricted to the Appalachian Mountains (here, the Taconic range) from New York south to the high Appalachians in Tennessee and North Carolina (Sinnott 1985). There are records from Washington and Essex Counties, New York, adjacent to Rutland County, but this record represents a northeastward extension of range.

Ribes rotundifolium belongs to subg. *Grossularia*, and in Vermont is most similar to *R. hirtellum* Michx., differing by more conspicuously exerted stamens at anthesis (Sinnott 1985). The following information regarding the occurrence is taken from the Jenkins *iNaturalist* observations: "Leaves only partly grown; flowers past peak bloom. The exerted stamens distinguish it from our other gooseberries except *Ribes hirtellum*; lab measurements gave a style length of 7–8 mm, and a ratio of style length/petal length between 3 and 4. *Hirtellum* typically has the style 4 mm or less and the ratio around 2. Habitat on the top of Austen [Hill] was typical dry-rich glades: red and chestnut oak, shagbark hickory, some pitch pine, prickly ash, a small shad [*Amelanchier*] in the *spicata-sanguinea* complex, ground layer dominated by *Carex pennsylvanica*, with *Danthonia spicata* and *Deschampsia flexuosa*; ground layer diverse with about 20 herbs and graminoids, including *Hepatica americana*, *Arabis lyrata*, *Helianthus divaricatus*, *Asplenium trichomanes*."

MALVACEAE**12. *Hibiscus moscheutos* L., Sp. Pl. 2: 693. 1753. Marsh rose-mallow.**

Windham Co.: Brattleboro, Wantastegok, cattail marsh at Retreat Meadow, NW shore, one large established wild stand, ~8+ ft tall, 31 Aug 2021, *Marcus, Holschuh, & Hohn s.n.* (VT).

This population is also reported on *iNaturalist* (Observation 13319673).

Newly arrived/first discovery. Moderately common near the Atlantic coast in southern New England, marsh rose-mallow may have been introduced at this site, which is a popular boating area with a well-used walking path along the north side. (See the next entry, *Nelumbo*, for additional details.). Even so, there is no particular reason to suspect such an origin (A. Marcus, pers. comm.). Additional details on the collection label include the associated species *Typha* indet. (possibly *T. ×glauca*), *Persicaria sagittata*, *Parthenocissus* sp., and *Onoclea sensibilis*. Flowers were noted to be white without a red base. Inspection in 2022 did not reveal any additional plants (Marcus, pers. comm.).

NELUMBONACEAE**13. *Nelumbo lutea* Willd., Sp. Pl. 2(2): 1259. 1799. American lotus.**

Windham Co.: Brattleboro, common in setback of the West River, just W of US Rte. 5 - E of Vt. Rte. 30 at Retreat Meadows, shallow water, muddy bottom, several large 40' × 50' patches, also in pond near radio tower N of West River Trail, 6 Aug 2022, *Gilman 22047, Anderson, Cooper, Duffy, Garrett & Angell* (VT, NEBC).

There are numerous Observations of this population posted on *iNaturalist*, the earliest being in 2022.

Newly arrived/first discovery. Retreat Meadows, known to the Elnu Abenaki Tribe as Wantastegok, is a backwater of the West River where it enters the Connecticut River. It was fertile, alluvial land cultivated by tribal members in precolonial times but was later inundated by the 1909 construction of the Vernon Dam on the Connecticut River, and today is a complex of open water and shallow marsh. It is considered an ecologically rich area and is a local birding hotspot and recreation site. *Nelumbo lutea* has been known from the area only since 2017 but it is now conspicuous with several large (and expanding) patches in various locations across the approximately 175-acre site. Its establishment here extends its range northward into Vermont while its “natural” range appears to be across the southeastern and midwestern US, except for the Appalachian Mountains, extending southward into Central America (Kartesz 2014). It is believed to have been intentionally planted at Retreat Meadows by seed by unknown persons (A. Marcus, pers. comm.) and at least some other New England populations are also considered introduced (Haines 2011).

PLANTAGINACEAE**14. *Veronica beccabunga* L., Sp. Pl. 1: 12. 1753. European brooklime.**

Chittenden Co.: Williston, steep shady riverbank not far above water level, below most other vegetation, left bank of the Winooski River a little downstream of North Williston Road, 22 Sep 2021, *Gilman 21086* (VT).

Newly arrived/first discovery. Most floristic treatments (Borrisova 1955; Haines 2011, Ellmouni et al. 2018, Albach 2021) maintain European *Veronica beccabunga* and North American/East Asian *V. americana* as different species, a position upheld by recent molecular and morphological investigations (Ellmouni et al. 2017). Even so, distinctions based on morphology can be challenging (Albach 2021). The current collection, made late in the season, has only a few small inflorescences, with no petals and only immature fruit. The remnant styles are short (ca. 1.5) mm, but that small size

may be a function of the weak and late anthesis. Nevertheless, the sprawling habit and the very broadly ovate to nearly orbicular leaves with rounded tips are unlike those of *V. americana*. They are, unusually, nearly entire although close inspection reveals very shallow crenations on some margins.

Veronica beccabunga was first collected in northeastern North America in 1876, in New Jersey, likely from ship ballast dumps near New York harbor (Les & Stuckey 1985), although it had been introduced much earlier, “à la période français,” near Québec City (Victorin 1964) and may have been used there as a cress. From the New York area, *V. beccabunga* has gradually spread west and north (Les and Stuckey 1985). In New England, it is previously known from Maine, Massachusetts and Connecticut (Haines 2011).

The habitat of the current collection was somewhat unusual for the species: the bank of the Winooski River, a dynamic habitat subject to fluctuating water levels and ice scour. *Veronica beccabunga* usually occurs in shallow, very slowly moving or, rarely, stagnant water (Albach 2021). Although several miles of riverbank were inspected, only this one population was observed.

POACEAE

15. *Digitaria ciliaris* (Retz.) Koeler, Descrip. Gram. 27. 1802. Southern crabgrass.

Chittenden Co.: Essex, adjacent to 70 Kiln Road about 500ft E of a water tower, disturbed trail margins in a sandy powerline right-of-way next to residential lawns, 44.48557N, -73.08862W, WGS 1984, 22 Oct 2022, *Peters 22-189* (VT). Milton, Milton Landfill at the end of Landfill Road, 44.62628N, -73.12959, WGS 1984, in disturbed sand and gravel driveway and ground asphalt adjacent to a capped landfill, 27 Sep 2022, *Peters 22-170a* (VT). **Addison Co.:** Cornwall, edge of Vt. Rte. 125, junction of West Street just S of bridge over the Lemon Fair River, 4 Sep 2021, *Gilman 21071* (VT).

Newly arrived/first discovery. Tribe Paniceae. This species of Asian origin has only recently been recognized as a weed in New England. Although indicated by Chen & Phillips (2006) to be a pantropical weed it escapes the need for a tropical climate by its annual life-cycle. In the USA, it is known across the continent from Massachusetts and New York to Texas and New Mexico (some scattered reports elsewhere in the West), south through Florida (Wipff 2003).

In gross morphology *Digitaria ciliata* very closely resembles *D. sanguinalis* (L.) Scop. but differs in details of the inflorescence and florets (Werier 2020). The upper glume is $>0.5\times$ as long as the lower lemma vs. $<0.5\times$ as long, and the lateral veins are glabrous or only rarely pubescent distally vs. pubescent in *D. sanguinalis*. Furthermore, the lateral veins of the lower lemma are arrayed near the lemma margins rather than being distributed equidistantly across the lemma. Judging from the specimens cited, this character seems to be best expressed on immature florets because, as the developing caryopsis expands and pushes the lemma outward, the vein arrangement seems to become more equidistant.

After being apprised of its possible occurrence in Vermont (David Werier, pers. comm.), the author located it on the first attempt after only a very brief search of appropriate habitat. Perhaps it is already widely present in cultivated and ruderal sites after a period of stealth colonization.

16. *Microstegium vimineum* (Tri.) A. Camus, Ann. Soc. Linn. Lyon, sér. 2, 68: 201. 1921 [1922].
Japanese stilt grass.

Addison Co.: Middlebury, SE edge of paved college walkway SE behind Brackett Hall, 3 Jul 2022, *Marcus s.n.* (VT). **Rutland Co.:** Benson, 2-track access road to Pond Woods WMW [Wildlife Management Area], only a couple dozen feet off the main road, 13 Jun 2022, *Marcus s.n.* (VT).

Windham County, Brattleboro, Highlawn Ave., roadside and within a private residential yard, west side of the road, S of Western Avenue, at roadside on the edge of a lawn and adjacent to a hedge as part of a neighborhood population, periodically controlled via hand-pulling. 13 Aug 2020, *Garrett 2020-008* (VT). Brattleboro, small plants, between pavement and sidewalk, residential area, corner of Highland Avenue and Crosby Street, 6 Aug 2022, *Gilman 22048, Duffy & Garrett* (VT, NEBC).

Also see *iNaturalist* Observations 66008977, 66008978 & 89548589 of the Brattleboro population, and *iNaturalist* Observation 4206677 from Rutland Co.: Poultney.

Newly arrived/first discovery. Tribe Andropogoneae. *Microstegium vimineum* is somewhat unusual among warm-season grasses with the C₄ carbon fixation pathway in being adapted to a shaded, forest habitat (Winter et al. 1982); most plants with this pathway occur in high-light habitats. It is of East Asian origin and is well known southward in the U.S. as an invasive species of forests, forest edges, ditches and other wet to mesic habitat where it can form extensive carpets. Barrett et al. (2022) elucidated its invasion history: although known as early as 1919 in Tennessee, in the Northeast its invasion likely began in the New Jersey–Pennsylvania area in the 1930's. Its appearance in Vermont has been anticipated as the species has been moving northward in recent years. For example, it was first recorded in Franklin County, Massachusetts, immediately south of Windham County, in 2007 and by 2020 was already considered “fairly common” with records from nine towns (Bertin et al. 2020).

Because *Microstegium* flowers in the autumn, it is found throughout the summer in a non-flowering state, at which time it may be mistaken for *Leersia virginica* Willd. Characters that vegetatively distinguish it from that species are its glabrous nodes and pubescent leaf-sheath summits (Thieret 2003), that it is of annual habit, rooting at the nodes (vs. perennial with rhizomes), and that the leaves have a conspicuous pale midrib (vs. pale but not conspicuous adaxially) but no strong secondary veins (vs. 4–6 strong secondary veins in *L. virginica*).

POLYGONACEAE

17. *Persicaria nepalensis* (Meisn.) H. Gross, Bot. Jahrb. Syst. 49: 277. 1813. Nepalese smartweed.

Windsor Co.: Thetford, East Thetford, Quail John Road (#1349), roadside edge, dense patch 3' × 80', 28 Aug 2020, *Norton s.n.* (VT).

Also see *iNaturalist* Observation 57628679, associated with this collection. There also is a convincing Observation #128354588 from the shoreline of the White River in Windsor Co.: Bethel.

Newly arrived/first discovery. Nepalese smartweed is an annual plant of relatively small stature (<0.5m) that has a wide Asian-African distribution (Hinds and Freeman 2005) and is now spreading in Europe (Uotila 2017) and North America (Hinds and Freeman 2005). A member of Section *Cephalophilon*, it can be readily distinguished from other Vermont *Persicaria* by its non-prickly stems, broadly rhombic leaves with a winged petiole, and small capitate inflorescences with a tuft of glandular hairs at the summit of the peduncle.

Persicaria nepalensis is considered to have potential as an important invasive species in New York (NYFA 2023), although it may have more weedy than invasive characteristics. Being an annual of short stature, it may not be an “ecosystem engineer” at least in our region.

ROSACEAE

18. *Aruncus dioicus* (Walt.) Fernald, Rhodora 41: 423, 1939. Goat's-beard.

Orange Co.: Thetford, Burnham Road (#630, opposite side of road), ditch, 27 Jun 2020, *Norton s.n.* (VT).

Also see *iNaturalist* Observation 51019599, associated with this collection. There are several other *iNaturalist* observations from various Vermont locations but, because this species is frequently cultivated, it may be that they do not represent escaped or naturalized plants.

Newly arrived/first discovery. Native to the Appalachian region, goat's-beard is modestly popular in horticulture and the current population is undoubtedly a short-distance escape from horticulture. Although it is *A. dioicus* var. *vulgaris* (Maxim.) H. Hara that was stated to be "cultivated and locally naturalized" and mapped for several states in northeastern North America by Mellichamp (2015), it appears that this occurrence is better referred to the typical var. *dioicus*, with moderately pubescent leaflets. The specimen cited is of a pistillate plant with rudimentary stamens, much shorter than the petals, and the size of mature carpels is not known. In *Aruncus*, although the specific epithet implies strict dioecy, some staminate plants may develop fertile, bisexual flowers, and these can produce fertile seeds (Robertson 1974). However, the current plant appears to have only female flowers and is not likely to produce seeds, lacking a pollen source. Hence, it is unlikely to spread except vegetatively.

RUTACEAE

19. *Phellodendron amurense* Rupr., Bull. Cl. Phys.-Math. Acad. Ip. Sci. Saint-Pétersbourg 15 (23-24): 353–356. 1857. Cork tree.

Chittenden Co.: Richmond, Bolton, 0.6 mi E of Jonesville, about 150 m E of Duck Brook and Boys Club Road in a narrow strip of trees between US Rte. 3 and RR tracks on the Winooski River; S of US Rte. 2 and 30 m N of the river's edge, in disturbed, weedy floodplain woods on silt loam alluvium, Single large, open-grown tree 28" diameter and about 40' tall with widely spreading branches, no evidence of having been planted or of reproduction although flowering/fruitletting abundantly, 15 Jun 2020, *Peters 20-12* (VT, NEBC). **Addison Co.:** Middlebury, Middlebury College campus, paved college patio and walkway behind Brackett Hall, and larger maturing trees NW of Brackett Hall along footpath on NE side of bridge across Gully, 9 Jul 2022, *Marcus s.n.* (VT).

Marcus indicates (pers. comm.) that the Middlebury population includes individuals that were not planted, i.e. are escapes from cultivation. There are also *iNaturalist* observations, with diagnostically convincing photographs of flowers and fruits from Grand Isle Co.: Grand Isle (Observations 82565732 and 89537327).

Newly arrived/first discovery. *Phellodendron amurense*, from the north-temperate deciduous forests of Korea, northeast China, and the Amur River basin of Russia (Dianxiang & Hartley 2008), is a northern member of a primarily subtropical and tropical genus, as is our indigenous shrub, *Xanthoxylum americanum* Mill., to which it is relatively closely related (Groppo et al. 2008). It was introduced into North America ca. 1856 (Rehder 1940). Ma and Brach (2007) reviewed its ornamental/horticultural use in America, primarily from plants originating at the Arnold Arboretum, near Boston. They concluded that it is not likely to be problematic from an invasive perspective. Many plants in horticulture are staminate-only, as is the specimen cited. That tree was large yet there were no seedlings or saplings nearby.

II. Previously excluded

ASTERACEAE

20. *Centaurea nigrescens* Willd., Sp. Pl. 3(3): 2288, 1803. Tyrol knapweed.

Bennington Co.: Pownal, 1 Aug 1937, *Ridlon s.n.* (VT-101153). Pownal, small group, very stout plants, roadside, Vt. Rte. 346, near Krigger Rocks (road to quarry), 10 Oct 2020, *Gilman 20127*

(VT, NEBC). **Windham Co.:** Dummerston, few, access road along powerlines, uphill and N of the West River, Camp Arden Road, 25 Oct 2022, *Gilman 22103* (VT).

Previously excluded. Tyrol knapweed was reported as *C. dubia* Suter from Bennington Co.: Pownal by Seymour (1982) in an appendix to the second edition of the Flora of New England, with the relevant specimen said to be at VT. However, that specimen, *mea culpa*, was not reviewed during development of the New Flora, nor was any duplicate seen. Hence, neither *C. dubia* nor *C. nigrescens* were mentioned in the New Flora. A [re]discovery of the species in Pownal in 2020 prompts its inclusion going forward. Keil & Ochsmann (2004) discussed the nomenclature of this species and its close relatives and concluded that the name applied here is appropriate at species rank, the earlier (1802) *C. dubium* being a *nomen nudum*. Interestingly, the current Bennington County record is from a road near the famous botanical locality known as “Kriger Rocks” and may be from the same, persistent population as Ridlon’s collection. The Windham County population was found only recently (autumn of 2022) and is on a transmission line corridor.

21. *Crepis nicaeensis* Baldinger & Pers., Syn. Pl. 2(2): 376. 1807. Turkish hawk’s-beard.

Chittenden Co.: Charlotte, 7 June 1875, *Pringle s.n.* (GH-10167246).

Previously excluded. In general, *Crepis* is uncommon and little known in Vermont. *Crepis nicaeensis* was originally described from Nicaea, now Iznik, Turkey. Its primary range is Mediterranean (Sell 1976) but it is widely introduced elsewhere in Europe (Greuter 2006). There are few North America records (Bogler 2006) and no recent Vermont collections. It was first reported from Vermont in the Flora of North America by Bogler (2006) and secondly by Haines (2011). These previously excluded reports were apparently based on the above cited sheet, which contains three specimens, one of *C. biennis* L. and two of *C. nicaeensis*, all annotated by Babcock, who noted (1947) that this species was introduced into eastern (and western) North America but cited no specimens from this region. This sheet is currently posted on digital databases (Harvard University Herbaria, Consortium of Northeast Herbaria) only as *C. biennis*. It was not, *mea culpa*, seen during development of the New Flora.

22. *Symphotrichum novi-belgii* var. *villicaule* (A. Gray) LaBrecque & Brouillet, Phytologia 82: 138. 1997. St. John aster.

Essex Co.: Brunswick, riverbank, 13 Sep 1941, *Pease 29,328* (NEBC-00697445); **Caledonia Co.:** Barnet, East Barnet, slaty river ledges, 27 Jul 1948, *Pease 33,741* (NEBC-00697446).

Previously excluded. This taxon was previously reported as *Aster longifolius* Lam. var. *villicaulis* A Gray (Eggleston et al. 1915; Dole 1937) and as *Aster johannensis* Fern. var. *villicaulis* (A. Gray) Fern. (Seymour 1969). It was discussed in the New Flora (p. 563) as a rivershore race of *S. novi-belgii* which, however, did not seem to comport entirely with the description of taxon *villicaule* because at least one population from the shoreline of the Moose River in Essex Co.: Concord had both glabrate and spreading-villous individuals. More recently, the collections cited here have been revised and annotated by Luc Brouillet, author of the *Symphotrichum* treatment in Flora of North America (2004) and recognized taxonomic expert in this group. The Eggleston collection cited as *Aster longifolius* Lam. var. *villicaulis* A. Gray by Dole (1937) from Essex Co.: West Concord, comprises two specimens, one at NEBC (00697447) annotated by Brouillet as var. *villicaule* and the second at GH (01031200), annotated by Brouillet as var. *novi-belgii*. Because of this discrepancy, the collection is not cited above. Note, the mapping shown on the Biota of North America Program (Kartesz 2014) and the USDA Plants Database (2023) is based on the report in Atwood et al. (1973).

POACEAE**23. *Andropogon virginicus* L., Sp. Pl. 2: 1046. 1753. Broomsedge bluestem.**

Windham Co.: Vernon, Roaring Brook Wildlife Management Area, entrance to an old log landing from open field with sandy dry soils; at least 20 clumps, likely more in the adjoining meadow, 6 Sep 2022, *D. Owczarski s.n.* (VT).

Previously excluded. Tribe Andropogoneae. This species was mapped for Vermont by the US Department of Agriculture (USDA 1970) but excluded in the New Flora, no specimen having been seen. Recently, it has been apparently migrating northward in the Connecticut River Valley, perhaps via wind-dispersed propagules. It was first recorded in Franklin County, MA—the county immediately south of Windham County VT—as recently in 1980 and with seven of nine town records there occurring since 2010 (Bertin et al. 2020). According to Haines (2011) it is sometimes weedy, invading pastures.

Andropogon differs from *A. gerardii* Vitman, Vermont's only other species of *Andropogon*, in several characters: inflorescences usually several, widely separated along culm vs. usually terminal only; rames 3–4 cm vs. 5+ cm; hairs at the summit of the peduncle and on pedicels conspicuously exceeding the florets vs. short and inconspicuous; and usually only the sessile spikelet formed vs. usually both the sessile and pedicellate spikelets formed (although the pedicellate spikelet of *A. gerardii* is only staminate). Broadly, the species includes several varieties, variously recognized or not, especially in the southeastern United States. In New England, we have only the typical variety (Weakley et al. 2022).

24. *Festuca saximontana* Rydb., Bull. Torr. Bot. Club 3: 53. 1909. Rocky Mountain fescue.

Lamoille Co.: Cambridge, Smuggler's Notch, rare (5 tufts seen), cespitose, leaves glaucous, tall N-facing schist cliff over narrow landslide gully, subalpine & treeless face, elev. 3000 ft., W side of Smuggler's Notch, with *Erigeron hyssopifolius*, *Campanula rotundifolia*, *Solidago randii*, *Aquilegia canadensis*, 22 Jun 1990, *Zika 10878* (VT).

Previously excluded. Tribe Poëae. The current collection was mentioned in the New Flora but had not been seen in time for inclusion when the manuscript was finalized. Collected in 1990, it was annotated in 2010 by Barbara Wilson, Research Associate at the Oregon State University Herbarium, who mounted a drawing of a leaf cross-section on the herbarium sheet. Due to its diminutive size and montane habitat, *F. saximontana* is difficult to separate from *F. brachyphylla* Schult. & Schult. f. which has long been known from Smuggler's Notch, and with which it has long been grouped. However, it differs in having more sclerenchyma in the leaves, which is a powerful diagnostic character in this genus (Aiken & Consaul 1995). The drawing by Wilson comports with those of *F. saximontana* published by Aiken and Darbyshire (1990, t. 29 f. c) and by Aiken and Consaul (1995, f. 1j) in the pattern and amount of sclerenchyma, although showing somewhat less sclerenchyma than in the drawings in Darbyshire and Pavlick (2007, 25: 430). In all these instances, the drawings show much more sclerenchyma than the comparative leaf cross-section illustrations for *F. brachyphylla*. According to Aiken et al. (1996), “the more extensive sclerenchyma development in the leaves of *F. saximontana*, ... gives the blades a rigidity and resistance to crumpling which sets it apart from *F. brachyphylla*. In *F. brachyphylla* the leaves are more often collapsed between the nerves and easily folded or crumpled.”

All previously collected specimens seen are from Smugglers Notch and all are *F. brachyphylla*, as now annotated. These are as follows: 16 Jun 1894, *Grout & Eggleston* (VT-039488, GH-00728079; US-04041868, image!); 9 Jul 1894, *Eggleston* (NEBC-00728078; NY-1690720, image!); 15 Jun 1895, *Grout* (NY-1690714, image!); 16 Jun 1895, *Grout & Jones* (VT-046584); 18 Aug 1899, *Eggleston* (NEBC-00728080!); 10 Jun 1908, *Kirk* (VT-039487, VT-039491).

The collector, W.W. Eggleston, had forwarded his 16 June 1894 and 9 July 1894 collections to F. Lamson-Scribner, Agrostologist with the US Department of Agriculture (USDA) who identified them as *F. ovina* L. var. *brevifolia* (R. Br.) Hack. That name turned out to be a synonym of *F. brachyphylla* and Lamson-Scribner's successor at the USDA, A.S. Hitchcock, listed them under the *brachyphylla* concept in Gray's Manual of Botany, 7th ed. (1907). The first erroneous report and the basis for most subsequent ones (Carpenter 1937, Fernald 1950, Seymour 1969, Kartesz 2014, USDA 2023) was made by Fernald (1935) and was based on the one GH and two NEBC specimens (although he did not cite the collectors), all three of which were annotated as *F. saximontana*. Those annotations are not signed or dated but research suggests that the error may have originated with the Canadian botanist, Ernst Abbe. Fernald (1935) stated that *F. brachyphylla* was "worked out [in relation to the European *F. supina* Schur] in the Gray Herbarium by my former pupil, now Dr. Ernst Abbe when identifying his Labrador material." Fortunately, the listing of *F. supina* in a draft manuscript of Labrador plants (Abbe 1931, p. 5) is annotated, presumably in Abbe's hand, "goes to *F. brachyphylla*." The handwriting there strongly resembles an annotation on the GH sheet, "not *F. brachyphylla*." The annotations to *F. saximontana* are not in Abbe's hand but strongly resemble Rydberg's own handwriting. I conjecture that Fernald, relying on Abbe's perception, passed the specimens to Rydberg, who—being essentially a Rocky Mountain specialist—may not have been familiar with *F. brachyphylla*, which is a more boreal-arctic taxon, and erroneously placed them with his own recently described *F. saximontana*.

Carpenter's report and transfer to the rank of *forma* under *F. ovina* (in Dole 1937) was apparently based only on Fernald's (1935) report, stating "collector unknown." Seymour's 1969 report was likely based on a combination of his own 1965 annotation of one of the *Kirk* specimens (VT-039487)—later annotated (1996) by Wilson as *F. brachyphylla*—and the NEBC specimens to which he directly referred.

Although occurring in the same subalpine habitat in Vermont, *Festuca brachyphylla* and *F. saximontana* differ in their ranges and typical habitats. *Festuca brachyphylla* is transcontinentally boreal, arctic, and montane, not entering the Prairie biome, while *F. saximontana* is more abundantly distributed in the Rocky Mountains, the Prairie Provinces, and near the Great Lakes, but is not or barely arctic. It is likely that these taxa arrived in Vermont via different routes.

POLYGONACEAE

25. *Polygonum buxiforme* Small, Bull. Torr. Bot Club 31(1): 56. 1906. Prairie knotweed

Polygonum aviculare subsp. *buxiforme* (Small) Costea & Tardiff

Addison Co.: Middlebury, 27 Aug 1900, *Brainerd s.n.* (GH-00954731). **Caledonia Co.:** St. Johnsbury, large plant, edge of pavement, runoff area, US Rte. 2 "Park & Ride" facility, 6 Sep 2021, *Gilman 21074* (VT, NEBC).

Previously excluded. This taxon was previously reported for Vermont by Costea et al. (2003) but, *mea culpa*, the Addison County specimen was overlooked in development of the manuscript of the New Flora. It came to my attention when the more recent (2021) discovery of the species in Caledonia County prompted another review. *Polygonum buxiforme* was treated as a subspecies of *P. aviculare* L. by Costea and Tardif (2003b) and by Costea et al. (2005) in the Flora of North America, although the Addison County specimen had been annotated in 2003 at species rank by Costea. The argument by Haines (2011) is convincing, that it makes sense for *P. buxiforme* as a North American indigene to be remote from *P. aviculare* which otherwise (with several subspecies) is Eurasian. In Vermont it seems to have been introduced from elsewhere as a ruderal weed and seems to be very rare. It is distinguished among Vermont *Polygonum* species by its broadly saccate outer tepals and in ocreae that remain somewhat more intact, not shredding as much as those of others in the dooryard-knotweed group.

ROSACEAE**26. *Rubus laciniatus*** Willd., Hort. Berol. 2: t. 1806. Cut-leaved blackberry.

Orange Co.: Thetford, Academy Road near Thetford Hill State Park, two smallish plants, primocanes only, 19 Jun 2020, *Gilman & Norton s.n.* (VT).

This collection is also supported by *iNaturalist* Observation 49561523.

Previously excluded. *Rubus laciniatus* was reported from Rutland County (Seymour 1969) and Windham County (Atwood et al. 1973) but was excluded from the New Flora. However, the current collection was clearly a roadside plant in a wooded area with no evidence of cultivation nearby. To the best of the author's knowledge, it is not a cultivated plant in Vermont today although it has escaped from cultivation elsewhere. It is now a significant invasive noxious weed in the Pacific Northwest, (Finn & Strik 2014) and is known from many regions across North America (Alice et al. 2014). Although introduced to North America from Europe, its original range is not known (Ball 1968).

A true blackberry (*Rubus* sect. *Rubus*), *R. laciniatus* is readily distinguished by its deeply dissected/lobed leaflets and, interestingly, by its petals that are also lobed/notched on their distal margin. The plants observed were only primocanes and did not have flowers. According to Finn & Strik (2014), it is a "trailing" blackberry and, as such, is less hardy than our native blackberries so, possibly, primocanes of the previous year did not survive winter to flower as floricanes. The entire plant, including the leaf axes, was strongly armed.

SCROPHULARIACEAE**27. *Verbascum phlomoides*** L., Sp. Pl. 2: 1194. 1753. Orange mullein.

Vermont: Rutland Co.: West Rutland, dry field, 1 Aug 1939, *Jansson s.n.* (CONN-00168036, image!).

Previously excluded. This species was reported by Seymour (1969b, 1982), Haines (2011), and Nesom (2019). It was, like *P. buxiforme*, excluded *mea culpa* from Vermont in the New Flora, but an image of the relevant specimen has recently been seen at the G. Safford Torrey herbarium (CONN, via CNH 2009). *Verbascum* is a Eurasian genus introduced into North America, and *V. phlomoides* is common in southern New England. It resembles *V. thapsus* L., very common in Vermont, by its leaves non-decurrent along the stem, flowers slightly larger (>30mm), ergo showier, and spatulate vs. capitate stigmas (Nesom 2019). It is similarly a biennial of dry soils and open, sunny habitats.

VIOLACEAE**28. *Viola odorata*** L., Sp. Pl. 2: 934. 1753. Sweet violet.

Chittenden Co.: Burlington, UVM campus, thickets, 30 Jun 1976, *Ahles 81749* (MASS-00372839, image!). Burlington, Salmon Hole, S bank of Winooski River, downriver from downtown Winooski, disturbed floodplain corridor, urban floodplain forest, 26 Apr 2020, *Fawcett 1329* (VT-310741). **Washington Co.:** Woodbury, along Tebbets Road, near height of land, sandy roadside and adjacent lawn, 14 April 2021, *Peters 21-007* (VT, NEBC); same location, 21 May 2021, *Peters 21-016* (VT, NEBC). Woodbury, South Woodbury village, Gray/Hayes residence at 1956 Foster Hill Road, across from Dog Pond Road, extensively naturalized throughout mowed lawn along Road, presumably escaped from former cultivation, 11 May 2022, *Peters 22-5* (VT, NEBC).

Also see the *iNaturalist* Observation 42724717 of the Burlington, Salmon Hole collection.

Previously excluded. Sweet violet had earlier been reported several times from Vermont. Those reports are not accepted as follows:

- Seymour (1969): Windham Co.: Jamaica. Based on a specimen at NEBC (00771640) collected 17 May 1907 by S.W. Wheeler, from Stony Park, Jamaica. The flowers on this collection are “double” and the label states, “exotic.” The specimen was annotated by Jenkins and Zika in 1987 as “not definitely escaped or naturalized in Vermont,” as was also stated by them in their 1995 list of exclusions (Jenkins & Zika 1995).
- Seymour (1969): Addison Co.: Middlebury. Based on a specimen at MASS (0037283-image!) collected 23 Jul 1905 by E. Brainerd and labeled, “Garden, seedlings growing spontaneously.” This collection was also excluded from the flora by Jenkins and Zika (1995) as being from cultivation.
- Atwood et al. (1973): Windsor Co.: Norwich. Based on a specimen at HNH collected by Richardson, not seen but previously excluded by Jenkins and Zika (1995) as “not definitely escaped or naturalized.”

Most of the current reports represent localized garden escapes, and it is certainly true that some *Viola* species, e.g., *V. cucullata* Ait., *V. labradorica* Schrank, and *V. pallens* (Banks ex DC.) Brainerd, are commonly found in lawns throughout Vermont. Sweet violet is distinguished by its very early spring bloom, very sweet scent, stoloniferous habitat, and pubescent capsules. It is of European origin.

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