ABSTRACT

Five old railroad corridors are present in Michigan as State Parks or Rails-to-Trails projects. These corridors have been left relatively undisturbed for 20 or more years since the abandonment of the railroads. Though many plant species are known to be characteristic of roadways, railroad rights-of-way, and similar disturbed sites, we could find no study to date characterizing the flora along these old rail routes in Michigan. This paper takes the first systematic look at the flora of a section of one of these trails, namely the White Pine Trail State Park that runs through Mecosta County in west central Michigan. This was the first major route for the introduction of invasive species to this area during and after the logging era (1845–1910 in Mecosta County) and into the settlement period (1855–1900). We provide a list of 491 species of plants found within the trail right-of-way through Mecosta County, and discuss the presence and absence of alien plants and species of medicinal value found along the route. We also speculate about the absence of a number of invasive species that seem conspicuously missing from the trail.

INTRODUCTION

The White Pine Trail is a Michigan State Park located in west-central Michigan, running from Comstock Park, north of Grand Rapids, to Cadillac. The trail is approximately 92 miles long and varies between 50–200 feet wide. In Mecosta County, the park is about 25 miles long, and varies from barely wider than the rail bed in some of the city locations to about 150 feet wide. It runs through the eastern edge of Aetna, Mecosta, Big Rapids, and Green townships and touches the northwestern corner of Deerfield, northwestern and southwestern corners of Austin and the southwestern corner of Colfax townships. The railroad right-of-way was purchased from the railroad by the State of Michigan Department of Transportation in 1991, and obtained by the Department of Parks and Recreation in the spring of 1994. The trail was dedicated on 20 July 1994, after a number of improvements which continue today (E. Fransen, Park Superintendent, pers. comm.). Because this corridor has been left reasonably intact for many years, there is some value to making a survey of the plant species (including plants of medicinal value particularly those that may be of commercial value) and therefore in danger of being collected, and to survey non-native and invasive plants.

And finally, we wished to apply to this survey what E. O. Wilson recently outlined in his “Workable strategy for halting the loss of species” commentary:
“to render conservation [of the White Pine Trail] both exact and maximally cost effective, [one must] complete the mapping of the [Trail’s] biodiversity” (Wilson 2002). Simply stated, one doesn’t know what has been lost without knowing what was originally present.

History

There has been a long history of movement of plants alien to this hemisphere. Starting as early as Columbus’ second voyage, horses were landed on New World soil, along with fodder necessary to feed them. The dumping of shipping ballast all along the eastern seaboard, from the Caribbean to Newfoundland, over centuries of exploration and trade brought many of our most common and noxious weeds (Cox 1999; Crosby 1986). Some common species have been in the Americas much longer than generally thought: White Clover (Trifolium repens) arrived in the 1500s, Purple Loosestrife (Lythrum salicaria) by the late 1700s, and Multiflora Rose (Rosa multiflora) by 1811 (Cox 1999; Crosby 1986). Some others were present at the time of the first floral survey of Michigan in 1837 (Darlington 1918; Voss 1972, 1985, 1996); and Rumex acetosella, Pastinaca sativa, Leonurus cardiaca, and Arctium minus (Voss 1972, 1985, 1996) were all present in the state by 1839. Many alien plants have been here so long that many people think of them as native. Westward expansion of people and plants into the Great Lakes region was minimal until the opening of the Erie Canal (1825) and Great Lakes shipping. Mass movement of European immigrants and cargo opened the door of Michigan to plants deliberately or unintentionally carried in the canal-boat and sailing-ship ballasts and dumped at the end of voyages (Cox 1999). Immigrants often carried plants and seeds familiar and useful to them. Plant acclimatization societies also introduced many non-native plants to North America. There is some evidence that the Native Americans did move some plants accidentally as well as intentionally around the state in trade and indigenous agriculture, but none that can be directly traced to Native American activity in Mecosta County. There was no known permanent Native American settlement in Mecosta County prior to the arrival of Europeans.

The Pre-settlement Map (MIRIS) of Mecosta County (Comer et al. 1995) indicates that the area of the county through which the White Pine Trail State Park now runs was entirely forested with beech-maple (apparently in climax, as understory of beech-maple is noted several times), pine, hemlock, ironwood, basswood, some ash and a bit of aspen. Oaks are noted as White Oak (Quercus alba) and Black Oak (Quercus velutina), or referred to as just oak, and they appear to be a minimal percentage of the full surrounding forest. The Black Oak is almost entirely confined to the “barrens” of the Coloma and Coloma-Coveret-Thetford soil associations in the sandy soils of the Muskegon-Little Muskegon River outwash deposits (USDA 1981).

Mecosta County’s European-influenced history began in the mid-1840s, as lumbering operations from Newaygo County began moving northeastward. These operations entered Mecosta County in Aetna Township and progressed northeastward across the area to the eastern townships over the next 40 years. White Pine was the main product, as it could be moved relatively easily by way
of the several river systems, principally the Muskegon and Little Muskegon Rivers, and because it was the only local wood that could be floated. Travel to the county by early roads was an ordeal, taking as much as six days by wagon from Grand Rapids (approximately 70 miles) by way of Newaygo. In the 1850s and 1860s, Big Rapids grew from a collection of huts around a sawmill to a small town. Other small communities in the county such as Morley, Stanwood, Borland, and Byers, as well as Crapo and Reed City in Osceola County, created a demand for rail service. The railroad’s primary functions were to remove timber; bring in supplies, forage, and livestock to the lumber camps and early farms; and to carry passengers and settlers into the area.

Cedar, hemlock, ash, maple, and oak could only be removed with rail service, as none of these woods would float. Lumbering operations began harvesting these previously ignored or “trash” species when the railroad became available. The Grand Rapids and Indiana Company was formed to provide that service, and track reached Morley by 1869 and Big Rapids in June, 1870. Rail operations reached their peak about 1900 and declined steadily afterward, with only a short revival in the 1930s and 1940s as tourist trains (Dunbar 1969), ceasing operations in the mid-1980s. The rails remained abandoned for several years until Rails-to-Trails project began to turn the right-of-way into a state park.

We were unable to locate any local persons who could elaborate on rail operations in the area that would have affected the plant life within the right-of-way boundary. It was obvious in the growth of aspens, oaks, cherries, and maples that some clearing was done in the right-of-way during the latter days of rail service. Some new successional growth from older woodlot stands adjoining the right-of-way then made incursions into the area. Also noted were many oak, maple, and linden trees, both individually and in woodlots and in the right-of-way, about 70-80 years of age or more, with many others in the area of 40–50 years of age (based on personal observations of comparing tree-ring counts on cut trees in the county, SR).

While some of the list’s weeds may have first entered the county along the rugged early roads, falling from hay wagons or from draft animals (fur, hooves, defecations), the railway was the prime entry route for invasive weeds. A large number of our general weed species, such as *Barbarea vulgaris*, *Melilotus alba* and *M. officinalis*, *Hypericum perforatum*, *Cichorium intybus*, and *Cirsium arvense* (Darlington 1918), entered the county by way of the early state road and rail transport in hay brought in for the draft animals, their bedding in rail cars, animal fur, contaminant seeds, and as garden plants. Several other introduced species are found only along the rail bed (*Acinos arvensis*, *Chaenorrhinum minus*, *Tradescantia ohiensis*), as the bed provides the only limestone in the county for calciphile plants, with the exception of the recent usage of crushed limestone in roadwork.

Some more recent weed arrivals that entered the county are *Abutilon theophrasti* and *Pastinaca sativa* as contaminants in agricultural seed. *Abutilon* was observed in a farm field along the trail in 1996 and is spreading rapidly through the county’s farming community, but has not yet appeared on the trail proper, while *Pastinaca* is rapidly spreading along the trail from a point of origin probably between 6 and 7 Mile Roads. *Sonchus arvensis* is common along
nearby roadsides and probably spread by vortex wind from passing vehicles, but so far is represented on the trail by only a few plants. *Elaeagnus umbellata* is a shrub widely planted by the Department of Natural Resources (DNR; the practice stopped in 2000) and offered by the Soil Conservation Service for wildlife plantings (the practice stopped in 1999). The berries are widely disseminated by birds (mostly by European Starlings *Sturnus vulgaris*) and the shrub is becoming widely established along the trail as well as overtaking old fields throughout the county. The origin of *Alliaria petiolata* here is not known, as the only known plants in the county were found in two widely separated locations on the trail during this study.

**Habits**

During their early days, railroad rights-of-way were routinely burned to keep down weeds and woody vegetation. As communities built up along the trail and mechanical mowing devices became available, fire clearing was discouraged. About 1930, when effective fire-protection and suppression equipment became available to communities and counties for safety and property-value reasons, fires no longer were used as a means of clearing. Until that time, unintended fires started by sparks from the engines, brakes, and off-track slash fires (such as those that swept much of Michigan in the 1880s) also burned beyond rights-of-way and into adjacent properties (Curtis 1959, p. 306). Other factors due to railway work, maintenance, topography, and erosion also created disturbed areas along the railway corridor. Such work and fires left a patchwork of vegetation along the corridor. Native plants adapted to fire would easily resprout if not burned too severely, and formed a buffer between the railroad and adjoining agricultural land (Curtis 1959, p. 306).

The trail as a whole is a variety of recently disturbed sites (road crossings, trail signage, paving), occasionally disturbed (edge mowing), open areas characteristic of old fields, established shrub borders with second growth, and a few fairly old, stable habitats. Most of the shrub borders and early second growth near the trail bed show some signs that cutting and trimming from fence to fence on the flat areas has occasionally occurred in the past 20 or so years. The most stable and oldest habitats border the fence lines well away from the rail bed, as well as along the steep banks, streambanks, and marshy areas. Some of the oldest trees probably approach 60 to 100 years of age, with a well-established understory of shrubs, trees, and lush herbaceous layers. These areas are small and few along the trail and associated with larger off-trail woodlots. A viewing of the whole trail on the county aerial photos (1999) in the Paris Wildlife Office files gives the appearance of the trail being one long, intermittent hedgerow. The trail passes through approximately 4.0 miles of city- and town-altered landscape (Morley, Stanwood, Big Rapids and Paris), with the majority of the rest of the trail being in a wide variety of successional states.

Several unusual plant habitats occur within the rail right-of-way that are not present (or quite limited) elsewhere in the county. These are:
1. Many locations on the central rail line are underlaid by limestone that occurs nowhere else in the region except for recent state and county roadwork;
2. Several rail sidings contain significant amounts of high-sulfur cinders (Big Rapids, Maple Street northward to a bit north of Baldwin Street; Stanwood; Byers; Borland; and Morley);
3. Farm-supply businesses along the trail (Stanwood and Big Rapids) and rail stations, where on- and off-loading of grains occurred, show higher concentrations of weeds than elsewhere on the trail (Arabidopsis thaliana, Thlaspi arvense, Lepidium virginica, Camelina microcarpa, Viola arvense, and Ambrosia trifida were only found in these locations);
4. A hillside seep and a swamp area about 0.25–0.75 mile south of Paris; and
5. A small, limey, damp-to-wet area 0.375 mile north of Angling Road.

METHODS

The entire length of the trail was surveyed three times during 2001; 14 May–9 June, 3–26 July, and 10–29 September. The trail was divided into 10 segments (below) of similar habitat characteristics. Each segment was surveyed from fence to fence, and only species within the trail proper were included. A list of all plants observed was kept for each segment of the trail, and then summarized for the master list used in this paper. Some judgment had to be used, as the trail is not fully fenced due to a number of open boundaries with adjoining properties. In such situations, what appeared to be the most likely old fence line or property line was used. Also, in several city residential and city-maintained areas, lawns are mowed to the rail bed. An area directly behind the Stanwood Feed and Needs store (southwest corner of Jefferson at Front streets) from the building to the trail is not mowed, and certainty of property ownership is not known. Because this thin strip would normally be included in the right-of-way (and held so many interesting plants found only there), it is included. Additionally, the severe steepness of the banks in several places along the trail required these areas to be viewed from above and below for safety and to reduce disturbance.

When both observers were surveying, each took a side of the trail, recording notes and calling the other over to observe unusual or questionable species. We often switched sides during a section. Where just one of us surveyed, and the trip was one-way, the surveyer walked slowly and meandered from side to side; if walked round-trip, the survey was done up one side and down the other. Plants were collected only when necessary for later identification and for county records by permit from the State Park Superintendent. Herbarium specimens collected were sent to the University of Michigan Herbarium; collection numbers for voucher specimens follow the species annotation on the plant list in this paper.

Trail segments

1. Eisenhower Road to Morley: Trail right-of-way is open for a short distance north of Eisenhower but is quickly closed in to Washington Road by oak and aspen. Trail opens again at the Washington Road crossing then becoming wooded but more open than the previous half-mile. Numerous Quercus coccinea (Scarlet oak) and Q. velutina (Black Oak) line the route, with some Quercus macrocarpa (Bur Oak) just north and south of the Little Muskegon River Bridge. At Morley the trail opens up to heavily disturbed city park, old rail siding, and road crossings. Except at the crossings, bordering land is wooded to the east along Northland Drive and wooded and farmland on the west. Northland Drive parallels the trail on the east along this segment.

2. Morley to 4 Mile Road: From Morley to 2 Mile Road, the trail is heavily covered with bordering shrubbery of Lonicera tatarica (Tartarian Honeysuckle), Viburnum spp., and various Prunus spp. Several small wet areas are near trail within the right-of-way. From north of 3 Mile to 4 Mile Road, the trail is heavily wooded and closed in. There are numerous steep banks and bottomland wet
areas. Bordering lands are interrupted by several residential properties and open crossings. Otherwise, the vegetation forms a mix of continuous shrub border, woodland and stream, abandoned fields in succession, or current farming operations.

3. **Four Mile Road to 7 Mile Road:** A variety of small openings and field-like areas is present, often closed in by heavy shrubbery and overhanging trees. Bordering land is mostly agricultural on one or both sides, with several farm equipment rights-of-way crossing the trail. A residential area bordering on the east side of the trail about 0.33 mile south of 5 Mile Road has several cultivar plants that enter onto the right-of-way of the trail: one large stand of *Polygonum cuspidatum* (Japanese Knotweed) and an extensive patch of *Vinca minor* (Periwinkle) in particular. Along the curve south of 4 Mile Road, a stream parallels the west side of the trail creating a thin strip of wetland at the base of the bank to the fence. Several small wet depressions that dry up in late summer are found between 5 and 6 Mile Roads.

4. **Seven Mile Road to Johnson Road:** This section parallels 185th Avenue through Stanwood (Front Street in town) and is for the most part dry, except for one damp area, about 0.15 mile north of 8 Mile Road, which has the county’s only known example of *Equisetum variegatum* (Horsetail). Southwest of the corner of Jefferson and Front streets in Stanwood is a rich assortment of weedy forbs, several of which are county records. One of only three *Humulus lupulus* (Common Hop) plants known in the county occurs on the south side of a small stream crossing just south of the above location. Ditching along the trail presents numerous damp habitats mostly filled with *Cornus foemina* (Gray Dogwood).

5. **Johnson Road to Arnold Road:** For the most part, this stretch is dry upland along the trail proper, as the rail grade is elevated well above the surrounding right-of-way, sometimes by 30 to 50 feet. The right-of-way is mostly woodland of maple and aspen, with some oak. Several creeks cross beneath the rail bed and a number of small wetlands, ephemeral water in depressions, stream edge, and one beaver pond are all partly within the right-of-way. Land that is even with the rail bed is dry where open, and damp to dry woods where tree-covered. Two unique habitats to the trail are found in this section. One occurs in a damp section about 0.125 mile long about 0.375 mile north of Angling Road on the broad curve: a habitat of mesic plants in the trail and fringing ditch including *Cyperus rivularis* and *Rhynchospora* spp., among others. The second is a spent beaver pond whose stream now flows freely. Most of the aquatics for this stretch are found here at the bottom of the bank along the fence line.

6. **Arnold Road to North End Park:** This section is very dry, passing through open shrubby edge, bordering oak woodlands, and agricultural fields from Arnold Road to New Millpond Road. A large stand of *Corylus americana* (Hazelnut) is found along this stretch. From New Millpond Road to the south end of Big Rapids at M-20, the trail is dry and open with only a small amount of woodland sparsely treed with oak and cherry. As the trail passes through Big Rapids, from M-20 to North End Park, plants attuned to disturbance heavily influence the trail and there are many misplaced cultivars. Pavement of the trail begins just north of M-20, thus eliminating the trail-habitat zone (see below).
from there to Meceola Road. Ryan and Higginson Creek crossings provide the only wetland habitat on this stretch.

7. North End Park to 19 Mile Road: The trail is mostly wooded on the east by *Populus tremuloides*, *P. grandidentata*, *Acer* spp. and *Quercus* spp. The west side is similar but more open, with some field influence, particularly near North End Park. Several residences abut the trail on the west. Bordering land is wooded or field on both sides. After Spruce Road, the right-of-way is an open-woods border of *Acer* spp., *Prunus* spp., and *Ulmus americana* on both sides with much *Lonicera tatarica*; some of the woodlots extend into the bordering lands that are fallow fields.

8. 19 Mile Road to 20 Mile Road: Open field on both sides with a few small copes of woodland. Several commercial sites, particularly two cement plants, border the south end on each side. Bordering land is otherwise agricultural, cultivated, or abandoned.

9. 20 Mile Road to Paris Park: Except for a section about 0.375 mile long north of 20 Mile Road and in Paris, this section is wet with springy seeps, hemlock-cedar swamp, bordering wet ditches, and small streams. Open at both ends, this section is otherwise shaded by overhanging and fringing trees much of the length, or with open swamp-like vegetation of *Salix*, *Thuja*, and *Typha*. Bordering lands are marshy and wet on the east with open commercial land and fields at the southern end. A unique, steep, springy hillside runs along much of the west side in the central area. From the south end of Paris to Paris Park, the trail is commercial-residential with much disturbance from mowing, gardening, or localized soil disturbance, and heavily overgrown with weedy and viney growth; a number of garden escapes are mixed into this.

10. Paris Park to Meceola Road: Northward from the entrance to Paris Park, the trail is open and heavily disturbed by foot traffic and mowing. The trail is shaded by young aspens and oak not far beyond the park headquarters buildings to near 207th Avenue, where the trail opens and becomes shrubby and grassy to 23 Mile Road. From 23 Mile Road to Meceola Road (the end of the trail in Mecosta County) is open country with only a few shrubs and trees, heavily dominated by grasses.

The study also divided the trail into four habitat zones from the center of the trail to the right-of-way and two specialized zones comprised of any highly disturbed areas and rail sidings (5 and 6 below).

**Habitat Zones**

1. **Trail.** The trail center and former tracks and ties area: this is paved from Big Rapids to Reed City, eliminating all plants in segments 6–10 (from Big Rapids north to Meceola Road).

2. **Mown edge.** The mown edge of the trail extends from outside the rail bed to the end of mowing, about 4 to 6 feet wide on each side. The soil of the trail and the mown areas is gravelly, comprised of general gravel and/or crushed limestone or cinders mixed with the other two. This soil often extends a bit farther into the edge zone (below) or may extend some distance over and down the
steep banks onto the right-of-way. The banks may be nearly devoid of significant ground-cover vegetation.

3. *Edge*. This is an ill-defined but recognizable area from the edge of the mow line to the well-established right-of-way; width varies from none to about 5–8 feet wide depending on past disturbances. Edge is most prominent along wooded areas and least obvious in fields. The gravelly rail-bed soil fades out and more established humus and dirt based soil begins.

4. *Right-of-way* (rt-way in plant list). This is the area between the edge habitat and the fence of the railroad/park property; it varies from none (in towns) to about 40 feet wide on each side. This is the least-disturbed habitat and is largely made up of established humus-rich soils derived from woods or field vegetation and the underlying soil association. The right-of-way also varies from dry sandy openings to rich woodlands, wet depressions, streambeds, beaver ponds, cedar swamp, and marsh. This zone is often heavily wooded to the edge of the trail bed. The right-of-way may contain extensive areas of steep gravelly rail bed bank soil with little humus build-up or understory vegetation.

5. *Highly disturbed areas*. Any recently or regularly disturbed area such as recent dirt dumps, grading at road crossings, culvert work, signage, work around the recently installed pit-toilets in Big Rapids and Morley, and similar disturbances.

6. *Rail yards and sidings*. These are areas heavily filled with cinders as sidings in Big Rapids, Stanwood, and Morley. They are very dry, grassy habitats, often with old rail ties still in place. Only two plant species were found associated specifically with this habitat, *Selaginella rupestris* and *Euphorbia cyparissias*.

**Soils**

The White Pine Trail State Park crosses five of the eight major soil types in the county. Approximately half of the trail passes over the Mecosta Association, which is comprised of well-drained sandy outwash deposits on glacial till—essentially the geologic floodplain of the Muskegon and Little Muskegon Rivers. The other four associations are spottily distributed along the trail south of 12 Mile Road. No attempt was made to correlate plant diversity to the soil types. These soil types are only in the right-of-way of the trail, the rail bed being composed entirely of various fills. The dominant soil type for the length of the trail is the gravel railroad bed that comprises the soil for the plants growing in the trail, mow, and edge habitat zones described earlier. The right-of-way zone is also influenced by the rail bed gravel soil in areas of steep banks along the trail where valleys were filled with gravel. On the valley-fill banks (as high as 40 plus feet) there is sparse ground cover beneath the trees above, yet an equally shaded area on the right-of-way at the bottom of the embankments is very lush. Except for humus-rich organic soils in ditches, a few swampy areas, low depressions and the marsh between 20 Mile Road and Paris (Trail segment 9), the soil along the trail is porous and drains rapidly. In mid-summer, many of the herbaceous plants showed definite signs of drought stress.
County Soil Types crossed by the White Pine Trail (WPT). (Distances measured by map miles northward from the south county line).

1. Perrington-Coloma-Ithaca Association. Miles approximately 5–7 and 10.5–11.25: “Nearly level to steep, well-drained, somewhat excessively drained, and somewhat poorly-drained, loamy and sandy soils that formed in glacial till or outwash deposits.”

2. Coloma Association. Miles 7–8 and 9–10.75: “Nearly level to steep, somewhat excessively drained, sandy soils that formed in glacial till or outwash deposits.”


4. Mecosta Association. Washington Road to Little Muskegon River, Mile 12 to Meceola Road: “Nearly level to gently rolling, somewhat excessively drained, sandy soils that formed in outwash deposits or glacial till.”


RESULTS

The study of the White Pine Trail State Park through Mecosta County found 491 species of vascular plants in 96 families and 278 genera within the right-of-way. Lichens, liverworts, and mosses were not surveyed. Only one species, Prairie Smoke Geum triflorum, appears as Threatened on the Michigan Natural Features Inventory/DNR list of Endangered, Threatened, and Special Concern Species (MNFI 1999). One state record plant, Rhamnus purshiana, was found.

Nearly 30 percent (146 species or 29.7%) of the total species are considered to be non-native Eurasian or South American introductions or adventive from the western or southern United States. Here, the authors have followed Voss’ (1972, 1985, 1996) assessment of foreign-acquired weeds. Included in this list are several Michigan natives that have become weedy in nature since the opening of the forests: Polygonum aviculare, Chenopodium album, Portulaca oleracea, Clinopodium vulgare, Galium aparine, and Achillea millefolium. Though they have North American as well as Eurasian origins, they are treated as non-native (Fogg 1945; USDA 1971; Mack 1991 and others). Urtica dioica is treated as a native (Voss 1985).

Of the 147 foreign species, 20 appear in the trail zone, with Echinochloa crusgalli (one plant) being the only species confined to the trail bed. Thirty-four species appear in the mow zone, with Alyssum alyssoides (common to abundant) and Salsola kali (few) confined to this zone. In the edge zone, there were 98 species with 32 of these species found only in this zone. The right-of-way (rt-way) zone held 77 species with 37 found only there. Nine species were found in the highly disturbed areas, and four were found only there. This is summarized in Table 1. All ten species representing the Caryophyllaceae are of foreign origin, as are 80% (12 of 15) of the Brassicaceae, and 83% (10 of 12) of the Polygonaceae.

There are problems in interpreting abundance. Because of routine mowing during the summer, it is difficult to determine fully the abundance of some of the
Creeping, early spring, and species growing low to the ground are accurately indicated. These include *Polygonum aviculare*, *P. scandens*, *Alyssum alyssoides*, the creeping *Euphorbia* spp., *Plantago* spp., and *Verbena bracteata*. Those that grow upright and are mowed are more difficult to determine. Such species as both *Melilotus*, *Daucus carota*, *Euphorbia esula*, *Ambrosia artemisiifolia*, *Centaurea maculosa*, *Cichorium intybus*, *Chrysanthemum leucanthemum*, and other tall species in the mowed zone are most often found heavily stunted and never reach their full height as they do in the edge and right-of-way zones, along roadsides, and in fields where they may dominate the same zone when not mowed. *Acinos arvensis*, *Berteroa incana*, *Chaenorrhinum minus*, *Chenopodium album*, *Dianthus armeria*, and *Sonchus arvensis* are all missing from the mow zone, an area compatible with their growth requirements. This is probably due to mowing rendering them unrecognizable, for they occur in the trail and edge zones. Species with large obvious basal rosettes like *Verbascum thapsus* and *Oenothera biennis* are accurately represented as they are so large as to be difficult to miss even when cut. Early spring grasses in the mowed zone, such as *Poa annua*, *P. compressa*, *Bromus inermis*, *B. japonica*, and *B. tectorum* are also accurately represented as they are well into blooming by the time the first mowing is done. Later-flowering grasses like *Dactylis glomerata*, *Phleum pratense*, *Sporobolus cryptandrus*, and *Agropyron repens* are often lopped off too short to be recognizable; it is only the few that send up new shoots between mowings that get counted, though an educated guess can be made from growth habits. Later low- and fast-growing grasses, *Agropyron repens* (recognizable though barely flowering), *Agrostis hyemalis*, *Digitaria ischaemum*, *Eragrostis pectinacea*, and *Panicum* spp., are accurately observed as to abundance, with *A. hyemalis* able to bloom well from a very low-cut level. *Saponaria officinalis* is readily noted in spring by its early leaves but appears to die back in the mowed zone throughout the summer while blooming freely in the edge and right-of-way zones.
Plants conspicuously fewer than anticipated, or absent

Portulaca oleracea (Pusley), all Silene spp. (Campions), Ranunculus acris (Tall Buttercup), Brassica kaber (Charlock), Capsella bursa-pastoris (Shepherd’s Purse), Malva moschata (Cheeses), Glechoma hederacea (Gill-over-the-ground), Lamium amplexicaule (Dead-nettle), Prunella vulgaris (Self-heal), Senecio vulgaris (Ragwort), Sonchus arvensis (Sow-thistles) are in surprisingly low numbers along the trail. Sisymbrium altissimum (Tumble Mustard), Trifolium aureum (Hop clover), Abutilon theophrasti (Velvetleaf), Chondrilla juncea (Skeletonweed), Crepis tectorum (Hawk’s-beard), and Sonchus asper (Sow Thistle) are absent from the trail. Most of these plants are readily found on nearby roadsides, waste areas and bordering agricultural fields. Several factors may influence this absence. Regular mowing may prevent late-season plants from growing to maturity, thus reducing their ability to reseed or reach significant height to generate enough nourishment to sustain growth for underground spreading. The trail-bed soil is calcium-rich along much of the trail, and would retard weeds preferring acidic soils. The trail bed and mow-zone soils are tightly packed, difficult to dig, and stable, no longer being regularly turned as would occur on graded roadsides and in farm fields just beyond the right-of-way. This lack of disturbance would prevent species from germinating that can lie dormant as seeds for many years. The numerous hedgerow-like stands of trees within the right-of-way reduce prevailing winds and, with fast-moving vehicles no longer using the trail, there is no vortex to draw wind-dispersed seeds along the corridor. For example, Sonchus arvensis lines the shoulder of the nearby Northland Drive that parallels the trail, but is seldom seen far off the edge of that road and only rarely along the trail.

We also made the general observation that up-slope trail banks (cuts through rises and hills) of natural local soil and down-slope trail banks (fills through valleys) where recent dirt fill has been added or more recently worked are well vegetated with shrubs and forbs while down-slope trail banks of railroad fill are poorly vegetated and particularly deficient of forbs. The fill soil is probably heavily influenced by slag and clinkers used in the fill (a few were found on sides of the banks, particularly in the larger fills) and lime leaching from the rail bed. Shade from overstory trees may have some influence but even here, up-slope wooded areas exhibited a lusher ground layer than similar down-slope situations.

Unique habitat of the cinder sidings

Curtis (1959) noted the uniqueness of habitats high in sulfurous coal cinders (rail sidings in trail segments 2, 4, and 6). We found these habitats to contain mostly stunted grasses, a few shrubby trees (particularly Ulmus pumila), and other similar plants common to dry habitats elsewhere along the trail. The two species peculiar to this habitat were Selaginella rupestris and Euphorbia cyparissias. Ambrosia psilostachya (Western Ragweed) was found between the rail bed and the cinder sidings, but not within the cinder soil. All three species can be found in other county soils, though none are common anywhere in the county.
Plants unique to the trail

There are no rocky outcrops of any sort in Mecosta County; therefore, the White Pine Trail affords the only surface exposure of calcium-based soils. Three calciphiles exist in the county only along the White Pine Trail: *Alliaria petiolata, Acinos arvensis* and *Chaenorrhinum minus*. They are present only where the majority of the soil contains limestone ballast, the presence of which was confirmed by testing with dilute hydrochloric acid. The location of several *Alliaria* plants along the trail marks the first observance of this troublesome weed in Mecosta County. *Rhamnus purshiana* (a state record plant) known only from this location is represented by only six plants on the trail. *Tradescantia ohiensis* appears south and north of Morley and in trail segment 6, with only a few plants found off the trail along Northland Drive near the Washington Road crossing at the south end of Trail section 1.

Medicinal Uses

Along the trail, 319 species (65.1%) were found to have noted medicinal value (Moorman 1986; Foster & Duke 1990; Kindscher 1992). The heightened interest in herbal medicine seems to know no limit. Since passage of the Dietary Supplement Health Education Act by Congress in 1994, herbal medicines and use of other complementary and alternative therapies that employ botanicals have generated billions of dollars of sales. Furthermore, it has been well publicized that many medicinal plants are being extirpated without regard to the preservation of the species (Foster & Duke 1990; Bourne 2000). This led to formation of the Medicinal Plant Working Group (MPWG) of the U.S. Fish and Wildlife Service (RJK is a member), chaired by J. Lyke, USFWS plant biologist, and an overall increase in protective activity for these types of plants. Included are the recent efforts of the U.S. Forest Service, as detailed in their “National Strategy for Special Forest Products,” and the USFWS-MPWG list of “Medicinal Plants Native to the U.S.: Indicators of Rarity and Threat for 205 Species,” as well as the U.S. Non-Timber Forest Products (NTFP) database (http://fcae.org/ntfpl).

Having conducted the survey, we next compared our findings with the above three references and to U.S. medicinal plants noted in Foster & Duke 1990, Moorman 1986, and Kindscher 1992. The surprising result was that fully 65% of the species (319 of 491) were identified as having a documented medicinal use according to one or more of the references. An additional 57, or almost 12%, were listed in the NTFP database as having food, decorative, or other non-medicinal uses. Forty-five species of medicinal plants found along the trail were listed in Lyke’s “Medicinal Plants Native to the United States: Indicators of Rarity and Threat for 205 Species.” Three of those (*Artemisia ludoviciana, Asarum canadense, and Eupatorium perfoliatum*) are listed as state-level concerns in Michigan. Only four of these cited medicinal species were abundant along the trail (*Equisetum arvense, Equisetum hymenale, Monarda fistulosa* and *Zanthoxylum americanum*) and only a very few species were locally common or common in a single section (*Sanguinaria canadensis, Asarum canadense,*
Podophyllum peltatum as examples). Collection is not allowed along the trail (without permit), but protection of these species could prove difficult as the trail is seldom patrolled.

DISCUSSION

The plant-community structure along the length of the White Pine Trail State Park in Mecosta County consists of a wide range of successional communities from the initial bare-earth stage to nearing climax Sugar Maple-Basswood. Beckwith (1954) lists the following stages in his study of succession on abandoned farmland in Washtenaw County, Michigan:

1. Bare soil
2. Crustose lichens
3. Mosses and foliose lichens
4. Annuals and biennials (1–2 years after abandonment)
5. Grass and other perennials (3 years after abandonment)
6. Mixed herbaceous perennials (6–10 years after abandonment, predominant at 11–15 years)
7. Shrubs (6–15 years after abandonment, predominant 16–20 years)
8. Shade-intolerant trees (sown soon after last cultivation, predominant 21–25 years)
9. Mid-tolerant trees (sown soon after last cultivation, predominant at 25 years plus)
10. Shade-tolerant trees (sown soon after last cultivation, predominant at 25 years plus).

A subjective view of this process along the trail indicates general agreement with this order and time frame. Stages one, two, and three are essentially absent along the trail except in several small patches in trail sections 4–6, in bare sandy areas in the right-of-way. The annual/biennial-stage plants along the trail bed and mow zone are more likely due to opportunity rather than a true successional stage because of continual disturbance from feet, bicycles, maintenance vehicles, Amish buggy traffic, and repeated mowing. What annual/biennial stage occurs is mostly in the edge zone. This zone disappears completely due to perennial-plant encroachment in the open areas. Only in the shade and semi-shade areas does the annual/biennial stage appear to exist as a successional stage. Zimdhal (1983) points out that the composition of a plant community is dependent on “local soils, their nutrient content, water capacity, and aeration” resulting in populations that may be limited to a few isolated plants. This appears to be true along the trail, as a number of aggressively weedy species (Capsella bursa-pastoris, Silene spp., and Sonchus spp., for example) in nearby fields and roadsides are found in very small numbers along the trail, probably mostly dependent on soil chemistry. The roadbed soil is tightly compacted and very difficult to dig into, but appears to retain a surprisingly high water content not far below the surface. At the same time, plants in the right-of-way may be exhibiting signs of drought-stress wilting.

The perennial grass stage is the first of the stages noted by Beckwith (1954) to be truly operating within the WPT right-of-way. The alien species along the trail correspond well with the analysis of species found in the agrestal weeds present in cultivated (corn) and grain-crop (winter wheat and alfalfa) agriculture ad-
joining the trail, with ruderal weeds, and with pasture-derived community weeds as detailed in his study. At present, all but a small portion of the adjoining agricultural land bordering the trail is planted in corn and other grain. Though crops are rotated, winter wheat, pasture grasses, and alfalfa were seen only in a few fields during our 2001-season study. Meyers (1979) indicates that a continual invasion of plants occurs, with a few becoming naturalized to an area. Many of the invasive weeds and escapes from cultivation that reach an area will fail to become established, and may persist only through continual reintroduction due to human activity. Many of the agrestal and ruderal weeds have lengthy dormancy periods (often decades), and so are in prime position to begin germination and growth soon after exposure. During major disturbance, such as the removal of the tracks and ties and subsequent leveling of the trail during preparation for public use, to such small perturbations as around holes dug for signage, these seeds are unearthed and grow. These processes as detailed in Beckwith and Meyers appear to be operating now.

While it is not possible to determine the exact origin of the alien weeds along the trail, early agriculture is the most likely source of many, primarily influenced by the railroad as a means of transport. Agricultural seed contamination with alien weeds was often quite high prior to pure-seed laws (Fogg 1945; Beckwith 1954; Mack 1991). *Agrostemma githago* was often considered a favorable weed among the early corn crops, for its large seeds could be used to pad the weight of the crop in poor corn-yield years (Beckwith 1954; Holzner 1982). Not to be overlooked either, as a source of weeds, are the various early state roads, the first of which was in progress by 1863. Such roads (there were three by 1879 when the last of the railroads entered the county) were built with hand labor and draft-animal-pulled wagons and graders, much in the manner that the railroads were bedded.

In his analysis of the offerings in early seed catalogs, Mack (1991) makes a convincing case that many of our alien weeds were introduced through mail-order purchases that became popular just after the Civil War, a time when rail and improved postal services provided more rapid and reliable delivery. Many of the seeds available in these catalogs were common weeds used for pot herbs, garden vegetables, medicinals, and ornamentals, and contained a high percentage of contaminant weeds. Travelers also likely carried a number of alien seeds for sale. John Chapman, “Johnny Appleseed,” for instance, was known to carry with him seeds of “mullein, motherwort, dandelion, wintergreen, pennyroyal, and mayweed and was expert in their use,” along with his famous apple seeds (Pollan 2001). Darlington (1918) remarks on the 50% rate of increase in introduction of plant species between 1881 and 1904, mainly due to the increase in road construction and railroads. Additionally, many alien seeds associated with areas surrounding railroad grain elevators in Canada have been documented by Alex (1982). He also attributes many alien seed introductions to 1.) Settlers trading seeds carried with them, 2.) The spread of seeds screened from seed purification businesses sold as livestock feed, 3.) Farmers purchasing unscreened feed grain for livestock, then using the seed for planting because it was cheaper, and finally 4.) Seeds introduced by spreading green manure on fields.

Another major source of weed seeds was in the ballast used in rail cars, which
was often dumped along the way. Presently, road work where county roads cross the trail turns over dormant seeds already present or adds new weeds when dirt is dumped to maintain the roads and trail crossings. A few final and probably minor sources of weeds along the trail are: seeds in tires of the few service vehicles and mowing machines used along the trail, wildlife movement across the trail from farmland (particularly deer), horse manure from Amish farmers who use the trail as a means of avoiding the busy Northland Drive paralleling the trail, farm vehicles crossing the trail at several points from one field to another, and pedestrian and bicycle traffic along the trail that bring in seeds on shoes and tires. Amish buggy wheels and horses’ hooves may carry more seeds to the trail than might be thought. A dozen weed species (Pastinaca sativa, Lathyrus tuberosus, and Lotus corniculata, as examples) are found on the trail only in the Amish farm area.

CONCLUSION

The White Pine Trail in Mecosta County, Michigan, passes through a wide variety of disturbed habitats as a corridor about 50–150 feet wide by approximately 25 miles long. Nearly 30% of the species found (146 of 491) are considered non-native weeds. The general habitat structure of the trail seems to be stable except where disturbed, with the most apparent spread of weedy plants appearing there. Annual weeds account for only 28% (43 of 147) of the weed species and reach their greatest concentration in the edge zone, as the calcium-rich soil of the trail and mow zones fades out and the perennials of the right-of-way do not outcompete them. The greatest concentration of species is found in the most stable habitat zones, the edge and right-of-way. Habitat structure ranges from small areas of bare soil to nearly climax woodland. Weed structure in the four vegetation zones (trail bed, mown area, edge and right-of-way) appears to follow quite closely that detailed in Beckwith (1954), except that the bare soil through annual stages are small in area or poorly represented. Many weeds of nearby agricultural and roadside sites were found either in small, scattered populations or absent. Ruderal weeds as a group are common along the trail, mow, and edge zones, though many are poorly represented. They reach their greatest abundance in the most recently disturbed areas, such as around new signage, dirt dumps, diggings, grading, etc. Perennials dominate the right-of-way in all habitats.

A wide variety of human-influenced sources is responsible for the introduction and distribution of the alien weed and weedy native species along the trail. The authors found no discernible evidence of natural arrival of these species to the trail environment, though some animal and wind distribution along the trail may occur. A general succession toward a woodland structure is apparent throughout the trail where left undisturbed and allowed to progress naturally. An unexpected 65% (319 of 491) of the species identified within the trail right-of-way have some alleged medicinal value (Foster & Duke 1990; Kindscher 1992; Moerman 1986).
DISCLAIMER

Identification of species with medicinal use should not be read as promoting actual or experimental use by individuals, who could thereby do harm to themselves or others. The listing of these species is not intended to be an herbal or medicinal guide to their use, only their presence and location along the White Pine Trail. Furthermore, the reader is advised that no collecting of these species along the trail is allowed without a permit from the State of Michigan.

LITERATURE CITED

The pteridophytes follow Lellinger (1985). The gymnosperms and angiosperms follow the order used in Voss (1976, 1985, 1996), but the species are listed in alphabetical order within families. Vernacular names generally follow these authors. Bolded species are non-native to North America.

The ethnobotanical medicinal uses for the plants in the list have been determined following the authority of Foster & Duke (1990; abbreviated as FD in the list below), Kindscher (1992; K in the list below), and Moerman (1986; Mo in the list below). Specifically used species are cited. In a few exceptions, species are correlated to a simple genus citation only by the authority.

**ABUNDANCE CODES**

A = abundant: almost everywhere along the trail segment and generally dominating long sections or large areas.
C = common: easily found but not dominating the trailside, often spaced between areas of the species.
La, Lc and Lu = plants that are locally abundant (dominates local area with no intervening species), locally common (thickly populating an area but with a few intervening species), or locally uncommon (in a localized area but individuals well spaced) along the trail. These plants may be in groups of singles or clusters at one point or a few points on the trail but widely separated by distance.
U = uncommon: fairly easily found but may be well spaced.
F = few: about 5–15 plants total and widely spaced along the trail.
1–5: number of single plants (or clumps of a clumping species) observed along the trail; could be more common but the few plants make exact numbers difficult to determine.
R = rare: a plant that is rare on the trail and also rare in the county overall. Any of the species above, except those marked with an R, may be common elsewhere in the county.

**ADDITIONAL SYMBOLS**

* = Another species in the genus is used medicinally, but not this species. The authority, however, notes the genus.
FD, K, and Mo indicate the authority describing plants having medicinal uses (see Literature Cited).

List summary: 491 species in 96 families and 278 genera. Non-native species, 146 (29.7%). Species with medicinal value as noted in literature, 319 (65.1%).

In the listing below, the data are given in the following sequence: Latin name and author; common name; medicinal information author, if any; number of trail segments where the species was found; range of abundance in the trail segments where the species was found; habitat zone(s); habitat and soil where the species occurred; Ross & Krueger collection numbers—all voucher specimens were sent to MICH.

**PTERIDOPHYTES**

**SELAGINELLACEAE (Spike-moss Family)**

*Selaginella rupestris* (L.) Link; Northern Spike-moss. 1, R. Rt-way; Big Rapids between Baldwin-Madison Streets; cindery siding soil.

**EQUISETACEAE (Horsetail Family)**


*Equisetum hyemale* L.; Scouring Rush (FD, K, Mo). 9, Lc-C. Mow, edge; damp to dry rail bed soil.

*Equisetum laevigatum* A. Braun; Smooth Scouring-rush. 4, F-Lc. Edge; wet soil.

*Equisetum palustre* L.; Swamp Horsetail. 2, Lc. Rt-way; wet depressions.


*Equisetum variegatum* Schleich. ex Usteri; Variegated Scouring-rush. (FD, Mo). 1, Lu. Edge; wet soil. 2027

**OSMUNDACEAE (Royal Fern Family)**

*Osmunda cinnamomea* L.; Cinnamon Fern (Mo). 6, Lu-C. Rt-way; rich, damp, shaded woods.

*Osmunda claytoniana* L.; Interrupted Fern. 4, Lu-C. Rt-way; rich, damp, shaded woods.

*Osmunda regalis* L.; Royal Fern (Mo). 3, Lu-C. Rt-way; rich, damp, shaded woods.

**PTERIDACEAE (Maidenhair Fern Family)**

*Adiantum pedatum* L.; Maidenhair Fern (FD, Mo). 2, Lu-F. Rt-way; low, damp, shaded soil.

**DENNSTAEDTIACEAE (Bracken Family)**

*Pteridium aquilinum* (L.) Kuhn; Bracken Fern (FD, Mo). 9, F-A. Edge, rt-way; dry semi-shaded soils.

**THELYPTERIDACEAE (Marsh Fern Family)**


**DRYOPTERIDACEAE (Wood Fern Family)**

*Athyrium filix-femina* (L.) Schott; Lady Fern (FD, Mo). 2, C. Rt-way; damp well-shaded woods.

*Cystopteris bulbifera* (L.) Bernh.; Bladder Fern. 1, C. Rt-way; damp shaded cedar soil.

*Matteuccia struthiopteris* (L.) Todaro; Ostrich Fern. 1, one large clump. Edge; shaded under shrubbery.

*Onoclea sensibilis* L.; Sensitive Fern (Mo). 7, Lc-C. Edge, rt-way; damp shaded woods.

*Polystichum acrostichoides* (Michx.) Schott; Christmas Fern (FD, Mo). 1, Three plants. Rt-way; damp rich woods.

**GYMNOSPERMS**

**PINACEAE (Pine Family)**

*Abies balsamea* (L.) Miller; Balsam Fir (FD, Mo). 1, One tree. Rt-way.

*Picea pungens* Englem.; Colorado Blue Spruce (Mo). 2, One-F. Rt-way; dry ground. Western NA.
Pinus resinosa Aiton; Red Pine (FD, Mo). 4, F. Rt-way; dry sandy soils.

Pinus strobus L.; White Pine (FD, Mo). 6, One-U. Rt-way; dry sandy soils.

Pinus sylvestris L.; Scot’s Pine. 4, F. Rt-way; dry sandy soils. Europe.


CUPRESSACEAE (Cypress Family)

Juniperus communis L.; Ground Juniper (FD, K, Mo). 1, U. Rt-way; dry open area in field.

Juniperus virginiana L.; Eastern Red Cedar (FD, K, Mo). 5, One-Lu. Rt-way; dry partially shaded areas.


ANGIOSPERMS MONOCOTS

TYPHACEAE (Cat-tail Family)

Typha latifolia L.; Common Cat-tail (FD, K, Mo). 6, Two-C. Edge rt-way; wet depressions.

Typha angustifolia L.; Narrow-leaved Cat-tail (FD, K, Mo). 2, F-C. Edge rt-way; wet depressions.

SPARGANIACEAE (Bur-reed Family)

Sparganium eurycarpum Engelm; Great Bur-reed (Mo). 1, La. Rt-way; well-shaded wet ditch south of Paris.

ALISMATACEAE (Water Plantain Family)


HYDROCHARITACEAE (Frog’s-bit Family)

Vallisneria americana Michx.; Wild Celery. 1 Lu. Rt-way; wet ditches south of Paris.

POACEAE (Grass Family)


Agrostis hyemalis (Walter) BSP.; Tickle Grass. 10, Lc-C. Trail, mow; open dry soil.

Andropogon gerardii Vitman; Big Bluestem (FD, K, Mo). 2, Two-U. Edge, rt-way; dry gravelly soil.

Brachyelytrum erectum (Roth) P. Beauv. 1, Lu. Rt-way; shaded woods edge.

Bromus pubescens Willd.; Canada Brome. 1, Three plants; Rt-way; shady woods on bank.

Bromus inermis Leysser; Smooth Brome. 10, A. Edge, rt-way; open gravelly soil. Europe.

Bromus japonicus Murray; Japanese Brome. 9, U-C. Edge; open gravelly soil. Eurasia.

Bromus mollis L.; Soft Chess. 1, Lu. Highly disturbed area, in dry sand along a crossing driveway. Europe. 2020

Bromus tectorum L.; Downy Chess (FD, Mo). 6, F-C. Edge, rt-way; open gravelly soil. Europe. 2026

Calamagrostis canadensis (Michx.) Beauv.; Reedgrass. 2, Lu-Lc. Rt-way; wet depressions.

Dactylis glomerata L.; Orchard Grass. 7, U-C. Edge, rt-way; dry open ground. Eurasia.

Digitaria ischaemum (Schreber) Muhl.; Crab Grass. 5, C-A. Trail, mow; dry, gravelly, open areas. Eurasia.


Echinochloa muricata (Beauv.) Fern.; Barnyard Grass. 1, Lu. Disturbed area around signage.

Elymus canadensis L.; Canada Wild Rye (Mo). 2, U. Edge; open to semi-shade.

Eragrostis pectinacea (Michx.) Nees. 6, Two-C. Trail, mow; dry disturbed soil.

Glyceria canadensis (Michx.) Trin.; Grass (Mo). 1, Lu. Rt-way; wet open depressions.

Glyceria striata (Lam.) A. Hitchc.; Fowl Manna Grass (Mo). 1, U. Rt-way; semi-shade, wet areas. 2019

Hydrispatula Moench; Bottlebrush Grass. 3, One-U. Edge; damp shaded soil.

Lolium perenne L.; Ryegrass. 7, Lc-C. Edge; as mix for erosion control.

Oryzopsis asperifolia Michx.; Rice-grass. 1, One plant. Edge; shaded rich woodland soil.

Panicum depauperatum Muhl. Panic Grass. 3, F-U. Edge; dry, gravelly, open areas.
Panicum latifolium L.; Panic Grass. 2, Lu-F. Edge; shaded woods.
Panicum linearifolium Britton; Panic Grass. 1, Lu. Edge; dry open areas. 2018
Phalaris arundinacea L.; Reed Canary Grass. 3, Lc-U. Rt-way; damp-wet open areas. Eurasia.
Phleum pratense L.; Timothy. 7, F-C. Mow, edge, rt-way; dry open areas. Eurasia.
Poa annua L.; Annual Bluegrass. 3, F. Trail, mow; open gravelly soils.
Poa compressa L.; Canada Bluegrass. 10, Lc-A. Trail, mow; open gravelly soils. Europe.
Poa pratensis L.; Kentucky Bluegrass. 8, U-A. Trail, mow; open gravelly soils. Europe.
Secale cereale L.; Annual Rye. 2, Three plants-U. Mow, edge; as a soil stabilizer. Escape from cultivation.
Setaria viridis (L.) Beauv.; Foxtail Grass. 10, Two-A. Trail, mow, edge, disturbed areas; dry soil. Eurasia.
Sporobolus cryptandrus (Torrey) Gray; Dropseed (Mo). 8, La-A. Trail, mow; dry gravelly soil.

CYPERACEAE (Sedge Family)
Carex albursina Sheldon. (Mo*). 1, One plant. Edge; shaded gravelly soil.
Carex arctata Boott. 1, Two plants. Edge; gravelly soil.
Carex argyrantha Tuckerman. 1, Three plants. Edge; dry, open soil among low grasses.
Carex bebbii (Bailey) Fern. 1, F. Rt-way; wet ditch.
Carex brevior (Dewey). Mack. (FD, Mo). 1, F. Rt-way; damp railbed, several clumps north of Angling Road.
Carex cristatella Britton. 2, One plant each. Rt-way; wet woods. 2048
Carex flava L. 1, Lc, Rt-way; damp soil.
Carex foenea Willd. 1, Lu. Rt-way; dry shaded grassy area north of Baldwin St., Big Rapids. 1196
Carex granularis Willd. 5, Two-F. Edge; damp gravelly soil.
Carex hystericina Willd. 3, Lu-Lc. Rt-way; low, shady, damp ground.
Carex interior Bailey. 4, F-U. Edge, rt-way; damp ground.
Carex intumescentis Rudge. 2, One plant-Lu. Rt-way; edges of wet ground.
Carex lupulina Willd. 2, Three plants-La. Rt-way; shady damp ground.
Carex muhlenbergii Willd. 1, One plant. Edge; just off tarmac between Colburn and Taft St., Big Rapids. 1195
Carex pensylvanica Lam.; Pennsylvania Sedge (FD, Mo). 9, La-A. Rt-way; dry shaded woods.
Carex sprengelii Sprengel. 3, F. Edge; damp soil.
Carex stipata Willd. 3, Lu-F. Edge, rt-way; damp ground.
Carex stricta Lam. Tussock Sedge. 1, La. Rt-way; damp to wet soils.
Carex vulpinoides Michx. (Mo). 1, Lu. Rt-way; wet ditch.
Cyperus fliculmis Vahl.; Nut-grass. 1, One plant-Lu. Edge; dry soil.
Cyperus rivularis Kunth; Nut Grass. 1, Lc. Traill; 0.375 mile north of Angling Road, damp soil in trail.
Rynchospora sp. (not identifiable to species; immature when found, later mowed); Beakrush. 1, Lu. Trail; 0.375 mile north of Angling Road, damp soil in trail.
Scirpus atrovirens Willd.; Black Bulrush. 5, Two-Lc. Rt-way; damp ground streams, depressions.
Scirpus cyperinus (L.); Wool-grass. 2, Lc. Rt-way; shaded and semi-shaded wet ground.
Scirpus expansus Fern.; Bulrush. 3, Lu-Lc. Rt-way; shaded and semi-shaded wet ground.
Scirpus pendulus Vahl.; Bulrush. 1, One plant. Rt-way; semi-shaded wet ground.

ARACEAE (Arum Family)
Calla palustris L.; Wild Calla (FD, Mo). 1, One clump-F. Rt-way; wet depressions.

LEMNACEAE (Duckweed Family)
Lemma minor L.; Duckweed. 4, Lc-La. Rt-way; wet ditches, depressions.
COMMELINACEAE (Spiderwort Family)
Tradescantia ohiensis Raf.; Spiderwort (FD*). 3, Three plants-Lc. Edge, rt-way; dry open/semi-shade areas. 2041

JUNCACEAE (Rush Family)
Juncus articulatus L. 1, F. Edge; damp ditch-edge soil.
Juncus dudleyi Wieg. 2, Lu-Lc. Trail; damp trail middle.
Juncus effusus L.; Soft Rush (Mo). 2, Lu-F. Rt-way; damp-wet depressions.

LILIACEAE (Lily Family)
Allium cepa L.; Garden Onion (FD). 1, One plant. Rt-way; escaped from cultivation.
Allium tricoccum Aiton; Wild Onion (FD, Mo). 3, Lu-U. Edge, rt-way; damp shady woods.
Erythronium americanum Ker; Trout-lily (FD, Mo). 1, One group-U. Rt-way; rich woodland soil.
Hemerocallis fulva (L.) L.; Orange Day-lily (FD). 3, Lc-F. Rt-way; escaped from cultivation.
Hemerocallis lilio-asphodelus L.; Yellow Day-lily. 1, F. Rt-way; Big Rapids. Escaped from cultivation.
Lilium michiganense Farw.; Michigan Lily. 4, One plant-F. Rt-way; damp shaded soil.
Maianthemum canadense Desf.; Wild Lily-of-the-Valley (FD, Mo). 3, Lc-C. Rt-way; rich woodland soil.
Smilacina racemosa (L.) Desf.; False Spikenard (FD, K, Mo). 8, Lu-C. Rt-way; damp, rich, woodland soil.
Smilacina stellata (L.) Desf.; Starry False Solomon’s Seal (K, Mo). 3, Lu-U. Edge; dry, gravelly soil.
Smilax rotundifolia L.; Greenbriar (FD, Mo). 4, One plant-F. Rt-way; shaded areas in damp soil and banks.
Smilax tamnoides L.; Greenbriar (Mo*). 2, One plant-Lu. Rt-way; shaded areas in damp soil and banks. 2022
Trillium cernuum L.; Nodding Trillium. 1, Three plants. Rt-way; rich, well-shaded bank soil.
Trillium grandiflorum (Michx.) Salsb.; Large-flowered Trillium (Mo). 6, Lu-C. Rt-way; deeply shaded rich soil.
Uvularia grandiflora Sm.; Bellwort (FD). 1, F. Rt-way; rich woodland soils.
Yucca filamentosa L.; Yucca (FD, Mo). 1, One plant. Rt-way; dry soil. Escaped from cultivation.

IRIDACEAE (Iris Family)
Iris pseudacorus L.; Yellow Flag Iris. 2, F. Rt-way; Big Rapids, Morley. Europe.
Iris versicolor L.; Blue Flag Iris (FD, K, Mo). 1, F. Rt-way; wet depressions.

ORCHIDACEAE (Orchid Family)
Cypripedium reginae Walter; Showy Lady Slipper. 1, Three plants. Rt-way; rich damp shaded soil.
Habenaria (Platanthera) hyperborea (L.) R. Br.; Tall Northern Bog Orchid (Mo*). 1, Two plants. Rt-way; cedar bottom next to stream.

DICOTS

SALICACEAE (Willow Family)
Populus alba L.; White Poplar (Mo). 2, Three plants-Lu. Edge, rt-way; cultivated planting. Europe. 1199
Populus balsamifera L.; Balsam Poplar (FD, Mo). 5, One plant-U. Edge, rt-way; dry soil.
Salix bebbiana Sarg.; Beaked Willow (K*, Mo*). 4, One plant-C. Edge, rt-way; damp open ground. 2015
Salix discolor Muhl.; Pussy Willow (Mo). 4, C. Edge, rt-way; damp soil, wet ditches.
Salix exigua Nutt.; Sandbar Willow (Mo). 1, One plant. Edge; top of high bank in gravelly soil. 2016
Salix humilis Marsh.; Upland Willow (K, M). 1, One plant. Rt-way; dry soil under oak and aspen. 1198
Salix lucida Muhl.; Shining Willow (FD, K, Mo). 2, F. Rt-way; damp soil at edge of wetlands. 1177

MYRICACEAE (Bayberry Family)
Comptonia peregrina (L.) Coulter; Sweet Fern (FD, Mo). 4, Lu-U. Rt-way; very dry sandy soil.

JUGLANDACEAE (Walnut Family)
Carya ovata (Miller) K. Koch; Shagbark Hickory (Mo). 1, Three plants. Rt-way; WPT at New Mill Pond Road southeast; dry soil.
Juglans nigra L.; Black Walnut (FD, Mo). 3, One plant-C. Rt-way; dry open soils.

BETULACEAE (Birch Family)
Alnus rugosa (Duroi) Sprengel; Tag Alder (FD, Mo). 5, One plant-F. Rt-way; stream edge at crossings.
Betula alleghaniensis Britton; Yellow Birch. 1, One plant. Rt-way; damp soil on bank.
Betula papyrifera Marsh.; Paper Birch (Mo). 6, One plant-F. Rt-way; damp soil, banks.
Betula pendula Roth; European Birch. 2, One plant each. Rt-way; Washington Rd, White’s Bridge. Europe. 1191
Carpinus caroliniana Walter; Blue Beech (FD, Mo). 4, F-U. Rt-way; rich, shaded woods.
Corylus americana Walter; Hazelnut (FD, Mo). 4, Lc-U. R-way; gravelly, dry, open soil.
Ostrya virginiana (Miller) K. Koch; Ironwood (Mo). 4, One plant-F. Rt-way; rich shaded woods.

FAGACEAE (Beech Family)
Fagus grandifolia Ehrh; Beech (FD, Mo). 2, One plant-F. Rt-way; woodland areas.
Quercus alba L.; White Oak (FD, Mo). 7, F-C. Edge, rt-way; dry soils.
Quercus coccinea Muenchh.; Scarlet Oak. 5, One plant-C. Edge, rt-way; dry soils. 2002
Quercus macrocarpa Michx.; Bur-oak (Mo). 9, One plant-U. Edge, rt-way; dry soils mostly on banks.
Quercus rubra L.; Red Oak (FD, Mo). 8, F-C. Edge, rt-way; dry soils.
Quercus velutina Lam.; Black Oak (Mo). 3, One plant-U. Rt-way; dry sandy soils.

ULMACEAE (Elm Family)
Ulmus americana L.; American Elm (Mo). 10, F-A. Edge, rt-way; damp to dry areas, many dead.
Ulmus pumila L.; Siberian Elm. 7, Lc-U. Edge, rt-way; most often lining trail in towns. Asia.
Ulmus rubra Muhl.; Red Elm (FD, Mo). 2, One plant-F. Rt-way; semi-shade.

MORACEAE (Mulberry Family)

CANNABACEAE (Indian Hemp Family)

URTICACEAE (Nettle Family)
Boehmeria cylindrica (L.) Sw.; Tall Nettle. 5, Lc-F. Rt-way; damp depressions.
Pilea fontana (Lunell) Rydb.; Clearweed. 1, Lc. Rt-way, damp depressions.
Pilea pumila (L.) A. Gray; Clearweed (FD, Mo). 2, La. Rt-way, damp depressions.
SANTALACEAE (Sandalwood Family)

Comandra umbellata (L.) Nutt.; Bastard Toadflax (FD, Mo). 5, F-C. Edge, rt-way; damp shaded soil.

ARISTOLOCHIACEAE (Birthwort Family)


POLYGONACEAE (Smartweed Family)

Polygonum aviculare L.; Knotweed (Mo). 3, Four plants-Lc. Highly disturbed mostly at crossings. New and Old World

Polygonum convolvulus L.; Black Bindweed. 1, Lc. Edge; semi-shade in gravelly soil. Europe.


Polygonum hydropiper L.; Water Pepper (FD, Mo). 1, F. Rt-way; edge of old beaver dam. Europe.

Polygonum pensylvanicum L.; Pinkweed. 1, Lc. Edge; SW corner Jefferson at Front, Stanwood.

Polygonum persicaria L.; Lady’s Thumb (FD, Mo). 5, One plant-F. Trail, edge; disturbed areas. Europe.

Polygonum scandens L.; False Buckwheat. 5, One plant-Lc. Highly disturbed areas; dirt dumps.

Rumex acetosella L.; Sheep Sorrel (FD, Mo). 7, Lu-C. Edge, rt-way; dry open areas. Eurasia.

Rumex crispus L.; Curly Dock (FD, K, Mo). 6, F-U. Edge, rt-way; dry to damp open/semi shade. Europe.

Rumex obtusifolius L.; Bitterdock (K, Mo). 1, F. Mow, edge; 0.25 mile south of 4 Mile Road. Europe.

Rumex orbiculatus A. Gray; Great Water Dock. 1, U. Rt-way; wet ditches south of Paris.

Rumex patientia L.; Patience Dock (Mo). 1, One plant. Edge; Big Rapids at Baldwin St. at WPT southwest corner. Eurasia.

CHENOPODIACEAE (Goosefoot Family)

Chenopodium album L.; Lamb’s Quarters (FD, Mo). 3, One plant-F. Trail, edge; highly disturbed areas. Eurasia.

Salsola kali L.; Russian Thistle. 2, One plant-F. Mow; dry ground, heavily cut. Eurasia.

AMARANTHACEAE (Amaranth Family)

Amaranthus blitoides S. Watson; Pigweed. 2, Lc-F. Rt-way; on dump of dirt in both locations.

Amaranthus retroflexus L.; Pigweed (FD, Mo). 3, Lu-F. Highly disturbed areas.

NYCTAGINACEAE (Four-o’clock Family)

Mirabilis nyctaginea (Michx.) MacM.; Four-O’clock (FD, K, Mo). 9, Two plants-F. Mow, edge; dry open soils.

MOLLUGINACEAE (Carpetweed Family)

Mollugo verticillata L.; Carpetweed. 1, Lc. Edge; on several dirt dumps.

PORTULACACEAE (Purslane Family)

Portulaca oleracea L.; Purslane, Pusley (FD, Mo). 1, One plant. Highly disturbed soil; Big Rapids. Western Asia, but also considered native.

CARYOPHYLLACEAE (Pink Family)

Agrostemma githago L.; Corn Cockle (FD, Mo). 1, R. Edge; few in Paris, rare in county but increasing. Eurasia.

Cerastium fontanum Baumg.; Mouse-ear Chickweed. 4, Two plants-F. Edge; dry shady soil. Eurasia.

Dianthus armeria L.; Deptford Pink. 7, Lu-F. Dry trail, edge, rt-way; shade and open areas. Old World.

Gypsophila paniculata L.; Baby’s Breath. 2, One plant each location. Rt-way; dry soil. Central Asia to Central Europe.

**Scleranthus annuus** L.; Knawell. 2, Lc-F. Mow; highly disturbed ground. Eurasia.

**Silene dichotoma** Ehrh.; Campion. 1, One plant. Edge; dry soil, just south of 4 Mile Road. Europe.

**Silene latifolia** Poiret; *(Silene pratensis of older works)*; White Campion. 9, Lc-C. Edge, rt-way; open field soil. Old World.

**Silene vulgaris** (Moench) Garcke; Bladder Campion. 6, One plant-F. Mow, edge; open gravelly soil. Eurasia. 2042

**Silene vulgaris** (Moench) Garcke; Bladder Campion. 6, One plant-F. Mow, edge; open gravelly soil. Eurasia. 2042

**Stellaria graminea** L.; Chickweed. 1, Two plants. Rt-way; dry semi-shaded soil. Europe.

**Stellaria media** (L.) Vill.; Chickweed (FD, Mo). 6, Lu-F. Edge, rt-way; gravelly and field soil. Eurasia.

**RANUNCULACEAE** (Buttercup Family)
- **Actaea pachypoda** Ell.; Doll’s Eyes (FD, Mo). 4, One plant -F. Edge, rt-way; damp shaded soil.
- **Actaea rubra** (Aiton) Willd.; Baneberry (FD, K, Mo). 1, F. Edge; damp shaded soil.
- **Anemone canadensis** L.; Canada Anemone (FD, K, Mo). 5, Lc-U. Edge, rt-way; damp shady areas.
- **Anemone cylindrica** A. Gray; Thimbleweed (Mo). 7, One plant-U. Edge, rt-way; shady areas.
- **Anemone quinquefolia** L.; Wood Anemone (FD)*. 6, One plant-U. Edge; dry soil.

**Aquilegia canadensis** L.; Wild Columbine (FD, K, Mo). 6, Lc-U. Edge, rt-way; shady damp to dry soil.

**Anemone canadensis** L.; Canada Anemone (FD). 5, Lc-U. Edge, rt-way; damp shady areas.

**Hepatica acutiloba** DC.; Hepatica (FD, Mo). 1, Lu. Edge; damp deep shady woods.

**Isopyrum biternatum** (Raf.) T. & G.; False Rue Anemone. 2, F-C. Rt-way; damp shaded soil.

**Ranunculus abortivus** L.; Small Flowered Buttercup (Mo). 1, U. Edge, rt-way; damp shaded areas.

**Ranunculus acris** L.; Tall Buttercup (FD, Mo). 2, U-C. Edge, rt-way; damp to dry open areas. Europe

**Ranunculus hispidus** Michx.; Swamp Buttercup. 4, Lu-C. Rt-way; wet depressions.

**Ranunculus sceleratus** L.; Cursed Crowfoot (Mo). 1, R, only known location in county. Rt-way; several in one wet depression north of Washington Road. 1190

**Thalictrum dasycarpum** Fisch. & Avé-Lall.; Purple Meadow Rue (Mo). 7, One plant-U. Edge, rt-way; rich, damp, woodland soils.

**Thalictrum dioicum** Fisch. & Avé-Lall.; Meadow Rue (Mo). 6, One plant-U. Edge, rt-way; rich, damp, woodland soils.

**BERBERIDACEAE** (Barberry Family)

**Berberis thunbergii** DC.; Japanese Barberry. 1, One plant. Rt-way; damp shaded soil. Asia. 1175

**Caulophyllum thalictroides** (L.) Michx.; Blue Cohosh (FD, Mo). 2, One plant-F. Rt-way; rich, damp, shaded soil.

**Podophyllum peltatum** L.; May Apple (FD, Mo). 7, La-C. Rt-way; woodland soils.

**MENISPERMACEAE** (Moonseed Family)

**Menispermum canadense** L.; Moonseed (FD, Mo). 1, La, two locations in one section. Rt-way; vining through shrubbery. 2053

**LAURACEAE** (Laurel Family)

**Sassafras albidum** (Nutt.) Nees; Sassafras (FD, Mo). 5, Lc-F. Edge, -rt-way; semi-shaded areas.

**PAPAVERACEAE** (Poppy Family)

**Chelidonium majus** L.; Celandine (FD, Mo). 2, F. Edge; damp shaded soil. Eurasia.

**Sanguinaria canadensis** L.; Bloodroot (FD, Mo). 6, Lc-C. Rt-way; damp, rich, shaded woodland soil.
FUMARIACEAE (Fumitory Family)

*Dicentra cucullaria* (L.) Bernh.; Dutchman’s Breeches (FD, Mo). 1, F. Rt-way; rich shaded soil.

CAPPARACEAE (Caper Family)

*Polanisia dodecandra* (L.) DC.; Clammy-weed (K, as a buffalo attractant; Mo, as *Cleome*). 1, Lu. Edge; dry, gravelly soil in semi-shade. Adventive from western US.

BRASSICACEAE (Mustard Family)

*Alliaria petiolata* (Bieb.) Cavara & Grande; Garlic Mustard. 2, One plant-F. Edge, rt-way; shaded gravelly soil. Europe and Asia. 1186

*Alyssum alysoides* (L.) L.; Pale Alyssum. 10, F-A. Mow; dry open, partially shaded soil. Europe-Asia Minor.

*Arabidopsis thaliana* (L.) heynh.; Mouse-ear Cress. 2, One to five plants. Edge; dry sandy and disturbed soil. 1197


*Barbarea vulgaris* R. Br.; Yellow Rocket (FD, Mo). 9, One plant-C. Edge, rt-way; dry open soil. Eurasia.

*Berteroa incana* (L.) DC.; Hoary Alyssum. 10, U-C. Trail, edge, rt-way; dry soil. Europe.


*Cameleina microcarpa* DC.; False Flax. 1, One plant. Edge; SW corner Jefferson at Front, Stanwood. Eurasia. 2025


*Hesperis matronalis* L.; Dame’s Rocket. 4, Lc-U. Edge, rt-way; damp shaded soil. Europe.

*Lepidium campestre* (L.) R. Br.; Pepper-grass. 9, F-C. Trail, mow, edge; dry gravelly soil. Eurasia.

*Lepidium virginicum* L.; Pepper-grass (FD, Mo). 1, Lu. Edge; SW corner Jefferson at Front, Stanwood. 2024


*Thlaspi arvense* L.; Penny Cress (Mo). 1, F. Edge; SW corner Jefferson at Front, Stanwood. Eurasia.

CRASSULACEAE (Orobam Family)


*Sedum spurium* Bieb.; Stonecrop. 1, Five plants. Edge; North End Park at WPT junction. Caucasus.

*Sedum telephium* L.; Live-forever (Mo). 1, Two plants. Edge; Big Rapids between Baldwin- Madison Streets. Eurasia.

SAXIFRAGACEAE (Saxifrage Family)

*Mitella diphylla* L.; Two-leafed Miterwort (Mo). 1, U. Rt-way; deeply shaded damp soil.

*Saxifraga pensylvanica* L.; Swamp Saxifrage (Mo). 4, Two plants-C. Rt-way; marshy areas in semi-shade.

*Tiarella cordifolia* L.; Foamflower (FD, Mo). 1, C. Edge, rt-way; damp gravelly bank and marshy soil.

GROSSULARIACEAE (Gooseberry Family)

*Ribes americanum* Miller; Currant (FD, K, Mo). 7, F-C. Edge, rt-way; damp shaded soils.

*Ribes cynosbati* L.; Prickly Goosberry (FD, Mo). 2, Two plants-F. Rt-way; damp shaded areas.

*Ribes rubrum* (sativum) L.; Red Currant. 1, Two plants. Edge; escape from cultivation in Paris. W. Europe.
HAMAMELIDACEAE (Witch-hazel Family)
*Hamamelis virginiana* L.; Witch Hazel (FD, Mo). 7, One plant-U. Rt-way; shady woods.

ROSACEAE (Rose Family)
Agrimonia gryposepala Wallr.; Agrimony (Mo). 3, Two plants-F. Edge, rt-way; shaded rich soil.
Amelanchier arborea (Michx. f.) Fern.; Shadbush (FD, Mo). 2, Three trees. Rt-way; semi-shade.
Amelanchier sanguinea (Pursh) DC. complex, Shadbush (FD, Mo). 1, One plant. Rt-way; open field.
Amelanchier sp., (FD, K, Mo). 1, One plant. Rt-way; open field.
Crataegus spp (We made no attempt to identify these to species. Most had flowers in poor condition after several storms and a late frost at the onset of our study; a two-month drought during the summer resulted in a very paltry crop of fruits by fall; there was also poor fruiting in *Rubus, Vitis, and Parthenocissus*). Four species might occur, to judge from differences in leaf shape); Crabapple (FD, Mo). 8, F-C. Edge, rt-way.
Fragaria virginiana Miller; Wild Strawberry (FD, K, Mo). 8, U-A. Mow, edge; shaded areas.
Geum aleppicum Jacq.; Yellow Avens (Mo). 5, Two plants-U. Edge, rt-way; field soils.
Geum canadense Jacq.; White Avens (Mo). 5, One plant-U. Edge; shaded woodland areas.
Geum triflorum Pursh; Prairie Smoke (K, Mo). 1, Three plants. Rt-way; about 0.25 mi. north of Washington Road. Michigan Threatened.
Malus pumila Miller; Apple (FD*). 7, One plant-F. Rt-way; in variety of open and shaded areas. Eurasia.
Physocarpus opulifolius (L.) Maxim.; Ninebark (FD, Mo). 3, One plant-F. Edge, rt-way; shaded shrubby areas.
Potentilla argentea L.; Silvery Cinquefoil. 1, One plant. Edge; dry gravelly soil.
Potentilla recta L.; Tall Cinquefoil. 10, Three plants-U. Edge; dry gravelly soil. Europe.
Prunus nigra Aiton; Cultivated Plum (K, Mo). 1, one cluster of trees. Rt-way; Big Rapids about 0.25 mile north of Baldwin St.
Prunus pensylvanica L. f.; Pin Cherry (Mo). 7, One plant-C. Edge, rt-way; gravelly and field soil.
Prunus virginiana L.; Choke Cherry (FD, K, Mo). 10, F-A. Edge, rt-way; gravelly and field soil.
Pyrus communis L.; Cultivated Pear. 1, One plant. Rt-way; field soil. Old World.
Rosa carolina L.; Pasture Rose. 6, F-U. Edge, rt-way; dry semi-shaded soil.
Rosa multiflora Murray; Multiflora Rose. 1, one moderate-sized shrub. Rt-way. E. Asia.
Rosa sp., Cultivar Rose. 1, One plant. Rt-way; shade at road crossing overhung by shrubbery.
Rubus sp. (*spectabilis?*) Willd.; Cultivar Raspberry. 1, F. Rt-way; several large flowered canes in shaded hedgerow. An often-cultivated western species. Not determinable to species for certain (Voss, pers. comm.)
Rubus allegheniensis Porter; Black Raspberry (FD, K, Mo). 8, F-C. Edge, rt-way; dry to damp semi-shaded soils.
Rubus flagellaris Willd.; Northern Dewberry (Mo). 7, F-C. Edge, rt-way; dry to damp semi-shaded soils.
Rubus hispidus L.; Swamp Dewberry (Mo). 1, U. Rt-way; open wet depression.
Rubus strigosus Michx.; Wild Red Raspberry. 9, U-C. Edge, rt-way; dry to damp semi-shaded soils.
Spirea alba Duroi; Meadowsweet (FD*, Mo). 5, Three plants-U. Rt-way; damp open ground.

FABACEAE (Pea Family)
Amphicarpaea bracteata (L.) Fern.; Hog Peanut (Mo). 4, Le-C. Edge, rt-way; dry shaded soil.
Coronilla varia L.; Crown Vetch (Mo). 2, F. Edge, rt-way; persisting after use as ground cover. Europe.

Desmodium nudiflorum (L.) DC.; Naked Flowered Tick-trefoil (FD, Mo). 2, One plant each location. Edge; deeply shaded rich soil.

Lathyrus latifolius L.; Everlasting Pea. 3, La-Lc. Rt-way; persisting after use as soil stabilizer. Europe.

Lathyrus ochroleucus Hooker; Pale Vetchling (Mo). 2, Two-four plants. Rt-way; dry shaded woods-edge soil. 1185

Lathyrus tuberosus L.; Tuberous Vetchling. 1, Two plants. Rt-way; dry, grassy area. 2052

Lespedeza hirta (L.) Hornem.; Hairy Bushclover (Mo*). 1, Lu. Rt-way; dry soil south of Arnold Road.

Lotus corniculata L.; Birdfoot-trefoil. 1, Lu. Rt-way; one clump in field soil. Eurasia.

Lupinus perennis L.; Wild Lupine (FD, Mo). 1, One plant. Rt-way; one plant in field soil.

Medicago lupulina L.; Black Medic. 10, C-A. Trail, mow, edge; gravelly soils. Eurasia.

Medicago sativa L.; Alfalfa (FD, Mo). 2, One plant-U. Edge; escape from cultivation. Europe.

Melilotus alba Medikus; White Sweet-clover (Mo). 8, F-C. Trail, mow, edge; gravelly soils. Old World.


Robinia hispida L.; Bristly Locust (Mo). 1, one large clump. Rt-way; at Riverside Camp entry south of New Millpond Road. Native in southeastern USA. 2014


Vicia americana Wild.; American Vetch (Mo). 1, F. Edge, rt-way; open woodland edge.

Vicia caroliniana Walter; Pale Vetch (Mo). 3, Lc-U. Edge, rt-way; open field or woods edge.

Vicia villosa Roth; Hairy Vetch (FD, Mo). 9, Lc-C. Edge, rt-way; open field. Eurasia.

Oxalis fontana Bunge. 1, F. Edge; damp soil.

Oxalis stricta L.; Wood-sorrel (Mo). 8, Lc-C. Mow, edge, rt-way; dry semi-shade.


Rhus copallina L.; Dwarf Sumac (FD, Mo). 1, Three plants. Edge; dry open soil.

Zanthoxylum americanum Miller; Prickly-ash (FD, K, Mo). 7, Two clumps-C. Rt-way; dry to damp soils.
**RHUS GLABRA** L.; Smooth Sumac (FD, K, Mo). 4, Two plants-F. Edge, rt-way; dry open to semi-shaded areas. 2047

*Rhus x pulvinata* Greene; Hybrid Sumac; this hybrid is listed in Voss (1985) from the county.

We found several finely hairy sumacs that appeared to be intermediate between *Rhus typhina* and *Rhus glabra*; none of them had either flowers or fruits; we used our best judgment with regard to the discussion in Voss (1985). 4. Edge, rt-way; dry open to semi-shade areas.

*Rhus typhina* L.; Staghorn Sumac (FD, K, Mo). 8, F-C. Edge, rt-way; dry open to semi-shaded areas.

*Toxicodendron radicans* (L.) Kuntze; Poison Ivy (FD, Mo). 9, Lc-C. Edge, rt-way; shaded ground.

CELASTRACEAE (Bittersweet Family)

*Celastrus scandens* L.; Bittersweet (FD, Mo). 1, Two plants. Edge; twining through shrubbery; those found are probably cultivars.

*Euonymus obovatus* Nutt.; Running Strawberry-bush (Mo). 5, Lu-U. Edge, rt-way; rich well-shaded soil.

ACERACEAE (Maple Family)

*Acer negundo* L.; Boxelder (FD, Mo). 8, F-C. Rt-way; alone or mixed among other species.

*Acer platanoides* L.; Norway Maple. 3, one tree to U. Rt-way; mostly near dwellings or in cities. Europe.

*Acer rubrum* L.; Red Maple (FD, Mo). 8, F-C. Rt-way; generally damp soils.

*Acer saccharum* Marsh.; Sugar Maple (FD, Mo). 10, F-C. Rt-way; individuals as well as in moderate-sized woodlots.


BALSAMINACEAE (Touch-me-not Family)


RHAMNACEAE (Buckthorn Family)

*Ceanothus americanus* L.; New Jersey Tea (FD, Mo). 1, U. Edge; dry shaded soil.

*Rhamnus purshiana* DC.; Buckthorn (Mo). 2, Six plants total. Rt-way; among other shrubs.

Western U.S. 2054

VITACEAE (Grape Family)

*Parthenocissus quinquefolia* (L.) Planchon; Virginia Creeper (FD, Mo). 4, F-C. Edge, rt-way; heavily vining through many trees and shrubs and along ground.

*Parthenocissus inserta* (A. Kerner) Fritsch; Woodbine (FD). 8, U-C. Edge, rt-way; heavily vining through many trees and shrubs and along ground.


TILIACEAE (Linden Family)

*Tilia americana* L.; Linden (FD, Mo). 10, F-C. Rt-way; damp to dry soils.

MALVACEAE (Mallow Family)

*Malva moschata* L.; Musk Mallow (Mo). 1, Lu. Edge; several in gravelly soil. Europe.

CLUSIACEAE (St. John’s-wort Family)

*Hypericum ascyron* L.; Giant St. John’s-wort. 1, Two plants. Rt-way; wet depression.

*Hypericum perforatum* L.; St. John’s-wort (FD, Mo). 9, F-C. Edge, rt-way; dry open areas.

Europe.

CISTACEAE (Rockrose Family)

*Helianthemum canadense* (L.) Michx.; Frostweed. 1, Lu. Rt-way; just south of Arnold Road.

VIOLACEAE (Violet Family)

*Viola arvensis* Murray; Field Violet. 1, Lu. Edge; SW corner Jefferson at Front, Stanwood.

Europe. 2023

*Viola cucullata* Aiton; Dog Violet (Mo). 1, U. Edge, rt-way; damp shady soil.

*Viola nephrophylla* Greene; Violet. 1, F. Rt-way; damp soil, mostly on logs.

*Viola pubescens* Aiton; Downy Yellow Violet (Mo). 2, U. Edge, rt-way; damp shady soil.
Viola rostrata Pursh; Long-spurred Violet. 1, F. Edge, rt-way; damp shady soil.

ELAEAGNACEAE (Eleaster Family)

Elaeagnus umbellata Thunb.; Autumn Olive. 8, F-C. Edge, rt-way; dry soils. Asia.

LYTHRACEAE (Loosestrife Family)


ONYGRACEAE (Evening Primrose Family)

Circaea lutetiana L.; Enchanter’s Nightshade. 3, Lu-C. Rt-way, deeply shaded damp soils.

Epilobium angustifolium L.; Fireweed (FD, Mo). 3, Lu-Lc. Rt-way; shady-open areas.

Epilobium ciliatum Raf.; American Willow-herb. 1, F. Rt-way; damp ground.

Epilobium coloratum Biehler. 1, F. Rt-way; damp ground.

Oenothera biennis L.; Evening Primrose (FD, K, Mo). 10, One plant-U. Trail, edge, rt-way; dry open areas.

Oenothera parviflora L.; Small Sundrops. 1, Lu, Rt-way; dry sandy-gravel soil; just south of 4 Mile Road.

ARALIACEAE (Ginseng Family)

Aralia nudicaulis L.; Wild Sarsaparilla (FD, K, Mo). 3, Lc-C. Rt-way; damp shady soil.

Aralia racemosa L.; Spikenard (FD, Mo). 1, Three plants. Rt-way; damp, rich, well-shaded soil.

APIACEAE (Carrot Family)


Daucus carota L.; Wild Carrot (FD, Mo). 9, F-C. Mow, edge; damp to dry. Old World.

Heracleum maximum Bartram; Cow Parsnip (FD, Mo). 4, Two plants-Lu. Rt-way; shaded wet depressions.

Osmorhiza sp. (prob. Clatonii (Michaux) C.B. Clarke; Sweet Cicely (FD, K, Mo). 1, One old seedless plant. Rt-way; shaded rich woodland soil.


Sanicula gregaria E. Bickn.; Snakeroot (Mo). 2, One plant-F. Rt-way; damp shaded soil.

CORNACEAE (Dogwood Family)


Cornus amomum Miller; Silky Dogwood. 2, Three plants total. Rt-way; wet soil, in fruit.

Cornus foemina Miller; Gray Dogwood (FD*, Mo). 9, La-A. Edge, rt-way; open damp soil, forming long hedgerows.

Cornus stolonifera Michx.; Red Osier Dogwood (FD*, K, Mo). 4, One plant-C. Edge, rt-way; wet ground.

ERICACEAE (Heath Family)

Chamaedaphne calyculata (L.) Moench; Leatherleaf (Mo). 1, three shrubs. Rt-way; wet boggy soil.

Gaultheria procumbens L.; Wintergreen (FD, Mo). 1, Lu. Rt-way; shaded woodland soil.

Vaccinium angustifolium Aiton; Low Sweet Blueberry (FD, Mo). 4, Lu-Lc. Rt-way; dry semi-shade.

PRIMULACEAE (Primrose Family)

Lysimachia ciliata L.; Fringed Loosestrife. 2, Lc. Edge; damp shaded soil.


OLEACEAE (Olive Family)

Fraxinus americana L.; White Ash (FD, Mo). 8, U-A. Rt-way; woodland, edge soils.

Syringa vulgaris L.; Lilac. 3, one to F clumps. Rt-way; Dry semi-shaded areas, usually near dwellings. SE Europe.

GENTIANACEAE (Gentian Family)

Gentiana andrewsii Griseb.; Closed Gentian (K, Mo). 4, Lu. Edge; damp ditches.
APOCYNACEAE (Dogbane Family)

*Apocynum androsaemifolium* L.; Spreading Dogbane (FD, K, Mo). 9, U-C. Edge, rt-way; damp or dry sandy soil, semi-shade.


*Vinca minor* L.; Periwinkle. 2, Lc-La. Edge, rt-way; shaded areas, ground cover. Europe.

ASCLEPIADACEAE (Milkweed Family)

*Asclepias incarnata* L.; Swamp Milkweed (FD, K, Mo). 1, F. Edge; gravelly soil.

*Asclepias syriaca* L.; Common Milkweed (FD, K, Mo). 10, F-C. Edge, rt-way; dry open areas.

*Asclepias tuberosa* L.; Butterfly Weed (FD, K, Mo). 3, One plant-Lu. Rt-way; damp to swampy ground.

CONVOLVULACEAE (Morning-glory Family)

*Calystegia sepium* (L.) R. Br.; Hedge Bindweed (FD). 3, Two plants-F. Edge; dry shaded soil.

*Calystegia spithamea* (L.) Pursh; Low Bindweed. 2, F. Edge; dry shaded soil.

CUSCUTACEAE (Dodder Family)

*Cuscuta gronovii* Schultes; Dodder. 1, La. Mow; covered mow for about 50 feet; just south of 207th Ave., 1988

POLEMONIACEAE (Phlox Family)

*Phlox divaricata* L.; Wild Blue Phlox. 1, F. Rt-way; rich damp woods soil.

HYDROPHYLLACEAE (Waterleaf Family)


BORAGINACEAE (Borage Family)

*Cynoglossum officinale* L.; Hound’s Tongue (FD, Mo). 1, Three plants. Edge; dry gravelly soil under elm. Eurasia.

*Hackelia virginiana* (L.) I. M. Johnston; Stickseed (Mo). 1, one small cluster. Edge; damp shady ground.


VERBENACEAE (Vervain Family)

*Phryma leptostachya* L.; Lopseed (FD, Mo). 1, Lu. Rt-way; rich, damp, woods soil.

*Verbena bracteata* Lag. & Rodr. Creeping Vervain (Mo). 5, Two plants-F. Mow, highly disturbed areas; gravelly soils.

*Verbena hastata* L.; Blue Vervain (FD, K, Mo). 2, U. Edge, rt-way; damp to dry field soils.

*Verbena stricta* Vent.; Hoary Vervain (Mo). 3, Two plants-Lu. Rt-way; dry open gravelly and field soil. 2061

LAMIACEAE (Mint Family)

*Acinos arvensis* (Lam.) Dandy; Mother-of-thyme. 10, Le-A. Trail, edge; limey gravelly soil. Europe.

*Clinopodium vulgare* L.; Wild Basil. 6, U-C. Edge, rt-way; damp shaded soil. Europe, but also considered native.

*Glechoma hederacea* L.; Gill-over-the ground (FD, Mo). 1, U. Edge; damp shaded ground.

*Leonurus cardiaca* L.; Motherwort (FD, Mo). 8, Four plants-U. Rt-way; damp soil, open and shade. Europe.

*Lycopus uniflorus* Michx.; Bugleweed. 3, Le-F. Edge; damp shaded soil.


*Monarda fistulosa* L.; Bergamot (FD, K, Mo). 9, F-A. Edge, rt-way; dry open areas.

*Monarda punctata* L.; (FD, K, Mo). Horseweed. 2, F-U. Edge, rt-way; dry open areas.

**Prunella vulgaris** L.; Self-heal (FD, Mo). 3, One-two plants each. Mow, edge; open gravelly soil. Europe, but also considered native.

**SOLANACEAE** (Nightshade Family)

**Physalis heterophylla** Nees; Ground Cherry (FD, K, Mo). 9, One plant-U. Mow, edge; dry open to semi-shaded soil.

**Physalis virginiana** Miller; Ground Cherry (K, Mo). 1, Lu. Edge; open field soil.

**Solanum ptychanthum** (nigrum) Dunal; Black Nightshade (K, Mo). 1, Lc. Edge, highly disturbed areas, dump piles.

**Solanum dulcamara** L.; Deadly Nightshade (FD, Mo). 6, Lu-C. Edge, rt-way; wet ground. Eurasia.

**SCROPHULARIACEAE** (Snapdragon Family)

**Chelone glabra** L.; White Turtlehead (FD, Mo). 2, F. Edge, rt-way; damp woods soil.

**Chaenorrhinum minus** (L.) Lange; Dwarf Snapdragon. 4, One plant-U. Trail, edge; limey gravelly soil. Europe.

**Linaria canadensis** (L.) Dum.-Cours.; Blue Toadflax. 3, Lu-U. Rt-way; very dry sandy openings.


**Pedicularis lanceolata** Michx.; Swamp Lousewort (Mo*). 1, Three plants. Rt-way; damp shaded ground.

**Penstemon hirsutus** (L.) Willd.; Hairy Beardtongue (Mo*). 3, F-U. Edge, rt-way; dry open ground.

**Verbascum blattaria** L.; Moth Mullein. 2, One to four plants. Edge; dry to damp, open, or shaded areas. Eurasia.

**Verbascum thapsus** L.; Common Mullein (FD, Mo). 10, F-C. Mow, edge, rt-way; dry open soils. Eurasia.


**PLANTAGINACEAE** (Plantain Family)

**Plantago lanceolata** L.; Rib Grass (FD, Mo). 6, F-A. Trail, edge; dry disturbed soil, open and semi-shade. Eurasia.

**Plantago major** L.; Common Plantain (FD, Mo). 7, F-C. Trail, edge; dry disturbed soil, open and semi-shade. Eurasia.

**Plantago rugelii** Decne.; Rugel’s Plantain (Mo). 5, F-C. Trail, edge; dry disturbed soil, open and semi-shade.

**RUBIACEAE** (Madder Family)

**Cephalanthus occidentalis** L.; Buttonbush (FD, K, Mo). 1, F. Rt-way; wet depression east of Morley-Stanwood High School.

**Galium aparine** L.; Cleavers (FD, Mo). 5, Lu.-C. Edge; damp shaded areas. Eurasia, but also considered native.

**Galium asperellum** Michx.; Rough Bedstraw (Mo). 4, F-C. Edge; damp shaded areas.

**Galium boreale** L.; Northern Bedstraw (Mo). 3, Lu-F. Edge; damp shaded areas.

**Galium circaezans** Michx.; (Mo). 2, Three plants-Lc. Edge; damp shaded areas.

**Galium lanceolatum** Torr.; Lance-leafed Bedstraw. 1, Lu. Edge; damp shaded areas.

**Galium triflorum** Michx.; (Mo). 3, F. Edge, rt-way; damp shaded areas.

**Galium verum** L.; Yellow Bedstraw. 3, one cluster-Lc. Rt-way; open areas. Europe, Middle East.

**Houstonia longifolia** Gaertn.; Long-leaf Bluet (FD*). 2, Le-C. Rt-way; very dry shaded soil.

**CAPRIFOLIACEAE** (Honeysuckle Family)

**Diervilla lonicera** Miller; Bush-honeysuckle (FD, Mo). 9, F-C. Edge, rt-way; shaded damp soil.

**Lonicera canadensis** Marsh.; Canadian Honeysuckle (FD, Mo). 1, one bush. Rt-way; deep shade on steep bank.

**Lonicera tartarica** L.; Tartarian Honeysuckle (FD). 9, F-A. Edge, rt-way; wide variety soils; form large hedges. Eurasia.
Sambucus canadensis L.; Elderberry (FD, Mo*). 5, Three plants-C. Rt-way; damp ground semi-shade.

Symphoricarpos albus (L.) S. F. Blake; Snowberry (Mo). 1, F. Edge, rt-way; damp shaded areas, probably bird spread cultivars due to proximity to houses.


Viburnum acerifolium L.; Maple-leafed Viburnum (Mo). 2, One or two plants. Rt-way; most probably an escape from cultivation.

Viburnum lentago L.; Nannyberry (Mo). 5, F-C. Rt-way; damp, semi-shaded hedgerows.

Viburnum opulus L.; High Bush Cranberry (FD, Mo). 2, One or two plants. Rt-way; most probably an escape from cultivation.

Viburnum rafinesquianum Schultes; Arrowwood. 7, F-U. Rt-way; damp, semi-shaded hedgerows. 2011

CUCURBITACEAE (Gourd Family)

Echinocystis lobata (Michx.) T. & G.; Wild Cucumber (FD, K, Mo). 3, Two plants-U. Rt-way; entwined in shrubs.

CAMPANULACEAE (Bellflower Family)

Campanula rotundifolia L.; Harebell (Mo). 1, Lu. Rt-way; very dry soil under oak. 2064

Lobelia siphilitica L.; Great Blue Lobelia (FD, K, Mo). 1, Lu. Edge; damp shaded ground south of Paris.

ASTERACEAE (Sunflower Family)

Achillea millefolium L.; Yarrow (FD, K, Mo). 10, F-A. Edge, rt-way; dry open field soil. Europe, but also considered native.

Ambrosia artemisiifolia L.; Common Ragweed (FD, K, Mo). 8, F-C. Mow; dry open gravelly soil.


Ambrosia trifida L.; Giant Ragweed (K, Mo). 1, F. Edge; SW cor Jefferson at Front, Stanwood.

Antennaria howellii Greene; Field Pussytoes (FD*). 5, One clump-C. Rt-way; dry open soil.

Antennaria parlinii Fern.; Pussytoes (FD, K). 2, One clump-U. Rt-way; dry open or shaded soil.


Aster pilosus Willd.; Frost Aster, 8. F-U. Edge, rt-way; open areas.

Aster puniceus Willd.; Purple-stemmed Aster (K, Mo). 6, F-C. Edge, rt-way; damp shaded and open areas.

Aster sagittifolius Willd.; Arrow-leaved Aster, 10. F-C. Edge, rt-way; shaded and open areas.

Aster umbellatus Miller; Flat-topped Aster (Mo). 3, U. Edge, rt-way; damp shady soil.

Bidens cernua L.; Nodding Beggar-ticks, 4, Lc-La. Rt-way; damp depressions.

Bidens connata Willd.; Beggar-ticks. 2, Lc-C. Rt-way; damp depressions.

Centaurea maculosa Lam.; Spotted Knapweed. 10, C-A. Trail, mow, edge, rt-way; dry soil. Eurasia.

Chrysanthemum leucanthemum L.; Ox-eye Daisy (FD, Mo). 10 F-C. Mow, edge, rt-way; dry open soil. Eurasia.

Cirsium arvense (L.) Scop.; Canada Thistle (FD, Mo). 3, One plant-U. Edge, rt-way; dry open areas. Eurasia.

Cirsium muticum Michx.; Swamp Thistle. 1, U. Rt-way; wet areas.

Cirsium vulgare (Savi) Tenore; Bull Thistle (Mo). 6, One plant-U. Rt-way; sunny areas. Eurasia.

Conyza canadensis (L.) Cronq.; Horseweed (K). 4, one plant-A. Trail, edge, rt-way; dry gravelly soil.

Coreopsis lanceolata L.; Lance-leafed Coreopsis (K). 3, One plant-F. Rt-way; damp shaded soil.

Erechtites hieraciifolia (L.) DC.; Fireweed (FD). 3, Lu-Lc. Edge, rt-way; damp open soil.


Erigeron philadelphicus L.; Common Fleabane (FD, K, Mo). 4, F-U. Edge, rt-way; dry open ground.

Erigeron strigosus Willd.; Daisy Fleabane (FD*, Mo). 9, F-C. Edge; dry open ground.


Eupatorium perfoliatum L.; Boneset (FD, K, Mo). 5, F. Rt-way; damp shaded depressions.

Euthamia graminifolia (L.) Nutt.; Grass-leaved Goldenrod. 5, Lu-U. Edge, rt-way; shady areas.

Gnaphalium macounii Greene; Clammy Cudweed. 1, Three plants. Rt-way; dry gravelly soil.

Helenium autumnale L.; Sneezeweed (FD, K, Mo). 2, One and two plants. Rt-way; wet ground.

Helianthus giganteus L.; Sunflower (Mo). 3, Lu-F. Edge, rt-way; shaded damp soil.


Hieracium aurantiacum L.; Orange Hawkweed. 2, Lu-F. Mow, edge; dry open soil. Europe.

Hieracium caespitosum Dumort.; Yellow Hawkweed. 7, One plant-C. Mow, edge; dry open soil. Europe.

Krigia virginica (L.) Willd.; Dwarf Dandelion. 1, Lu. Edge; dry open field soil.

Lactuca biennis (Moench) Fern; Tall Blue Lettuce (FD, Mo). 5, Lu-F. Edge, rt-way; shady damp soil.

Lactuca canadensis L.; Wild Lettuce (FD, Mo). 4, One plant-F. Edge, rt-way; shady damp soil.


Matricaria matricarioides (Less.) Porter.; Pineapple Weed (FD, Mo). 4, Two plants-F. Trail, mow, edge; gravelly soil and heavily disturbed areas. Western NA.

Prenanthes alba L.; Rattlesnake-root (FD, K, Mo). 5, One plant-U. Edge, rt-way; deep shade.

Rudbeckia hirta L.; Black-eyed Susan (FD, Mo). 5, U. Edge, rt-way; dry open areas.

Rudbeckia lacinata L.; Tall Coneflower (FD, Mo). 2, Three plants-Lu. Edge, rt-way; damp open areas.

Rudbeckia triloba L.; Thin-leaved Coneflower. 1, Lu. Edge; semi-shade north of Stanwood.

Senecio aureus L.; Common Ragwort (FD, Mo). 5, Lu-U. Rt-way; damp semi-shaded soil.

Solidago altissima L.; Tall Goldenrod (Mo). 10, U-A. Edge, rt-way; open field soils, semi-shade.

Solidago caesia L.; Blue-stemmed Goldenrod. 2, Two plants-Lu. Edge; shaded, damp, richer gravelly soil.

Solidago juncea Aiton; Early Goldenrod (Mo). 6, Lc-A. Rt-way; open field soil, semi-shade.

Solidago nemoralis Aiton; Gray Goldenrod (Mo). 8, Two plants-U. Edge, rt-way; dry open, sparsely vegetated areas.

Solidago patula Willd.; Rough-leaved Goldenrod. 1, Three plants. Rt-way; damp marshy soil.

Solidago rugosa Miller; Rough-leaved Goldenrod (Mo). 5, F-U. Edge, rt-way; damp, gravelly, open areas.

Solidago uliginosa Nutt.; Bog Goldenrod (Mo). 1, Three plants. Edge, rt-way; wet marshy soil.
Sonchus arvensis L.; Field Sow Thistle (FD, Mo). 1, Lc. Trail, edge; dry open ground, all depauperate. Europe.

Sonchus oleraceus L.; Common Sow Thistle (Mo). 1, one depauperate plant. Edge; dry ground. Europe.

Taraxacum officinale Wiggers; Dandelion (FD, Mo). 8, F-A. Trail, mow, edge; dry soils, disturbed areas. Eurasia.

Tragopogon dubius Scop.; Goat’s-beard. 8, 1 plant-A. Mow, edge, rt-way; dry open areas. Europe.

Tragopogon pratensis L.; Goat’s-beard (Mo). 7, F-C. Mow, edge, rt-way; dry open areas. Europe.

ACKNOWLEDGEMENT

The authors thank Margaret Ross for her efforts in proofreading and correcting a late version of our paper. We are most grateful.