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FIELD BOTANISTS OF ONTARIO NEWSLETTER

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President's Message

Spring is here once again although it may not feel like it quite yet. But as our hemisphere tilts toward to the sun, the plants are beginning to come out of dormancy. It is my favourite time of year. The buds of the Tulip Tree I planted last year have turned a bright yellow, like candles flames, lit up by the sun. The thermogenic Skunk Cabbage flowers have been out for a little while already, melting their way through the snow in some areas. And the garden variety Snow Drops and Siberian Squill (and their ilk) were popping up in lawns weeks ago. But as of Easter weekend, most of our native spring wildflowers are still at least a couple weeks away from making an appearance. With the increasingly higher temperatures and lengthening photoperiod, there is much more to look forward to seeing, and I'm sure most of us are eager to get out to the woods. Last May, I discovered an extensive population of Twinleaf that had just finished flowering, and I am determined to get out earlier and catch them in bloom this year.

With the coming of spring, the FBO field trip season is imminent. As usual, we've assembled another excellent program this year, offering a wide selection of botanical field trips across Ontario. The field trip list and registration package will be coming soon.

The FBO is offering the Student Award again this year. The Student Award is intended to recognize and encourage college or university students pursuing research in field botany or closely related studies. The award provides a small financial incentive as well as exposure for the student's research – both at the AGM and in the newsletter. Details of the award and the application are available on our website.

I hope you enjoy the field trip reports (if only one this time around) on the following pages. It's a pleasure to look back on past trips we attended and get a glimpse into the field trips we missed. Thanks to everyone who contributed.

Dan Westerhof

On the cover: Prickly Gooseberry as an epiphyte on Sugar Maple, Eramosa Township, August 2015. Photo: Bill McIlveen.

Sidebar artwork: Jack-in-the-pulpit (*Arisaema triphyllum*, formerly known under a glorious specific name of *atrorubens*)

Trip location maps generated using NatGeo Mapmaker software.

The suggested standard source for scientific and common names is the Database of Vascular Plants of Canada (VASCAN): (http://data.canadensys.net/vascan/search).

Field Botanists of Ontario website: **www.trentu.ca/fbo**

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Annual memberships are $20.00 for individuals and $25.00 for families. Membership forms can be found on the FBO website above.

Field Botanists of Ontario

(FBO) is a non-profit organization founded in 1984 for those interested in botany and conservation in Ontario.

Editor's Note

So, it looks like the FBO Newsletter is celebrating 30 years in service to the botanists of the province! Merely a running number on the cover: "Volume 30", but a small landmark nevertheless. We will carry on for another thirty years , and beyond. This is called *sustainable publishing*.

Now, for this anniversary issue of sorts, the editor is rather lost for words, because we have only two contributions to chat about. Pat Deacon appears to be a regular participant in the long-running series of "mystery tours", organized by Steve Varga, to many botanically interesting spots in the GTA. As usual, Pat has produced an exemplarily detailed account of a trip to a location in the Happy Valley Forest.

This issue, however, is overwhelmed by another fine monograph by Bill McIlveen, who always impresses us with an apparently non-exhaustive array of botanical distractions. This time, it's about a group of plants that may, at first glance, be regarded as too exotic or too "tropical" to even be present in Ontario, namely the epiphytes. Building on the classic papers of Paul Maycock of more than 40 years ago, Bill has produced a meticulously researched update of the status of this interesting group of plants which are, in our case, admittedly, accidental or opportunistic inhabitants of accumulated soil dust or humus somewhere in the decaying cracks or cavities of trees, where living is tough but the views are good. From now on, Bill, we will be looking for them as well!

Best to all of you,

Chris Zoladeski

Field Trip Reports

Touring the Happy Valley Forest

27 August, 2017

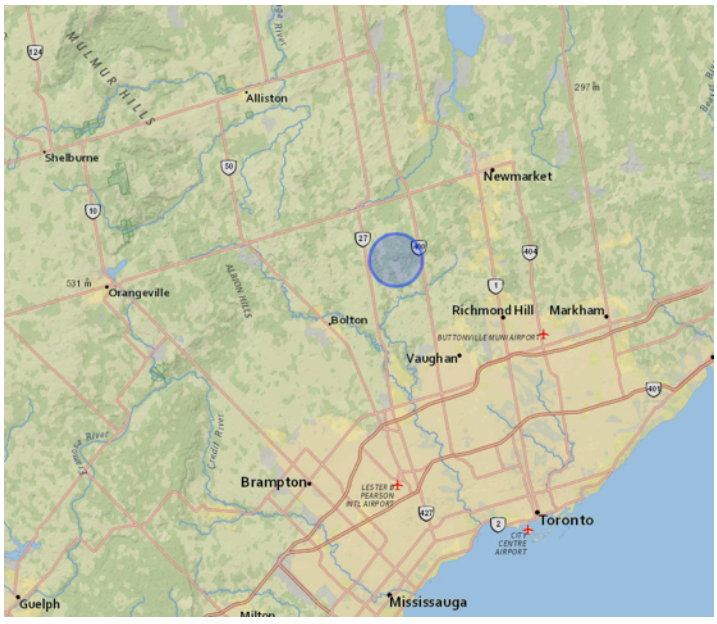
By Pat Deacon

The 2017 GTA Mystery Tour was held on August 27, 2017 in the Happy Valley Forest. This years' trip, led by Steve Varga, focused on the Mary Lou Rose Property which is immediately adjacent to the 2016 trip location held at the Olamor Property. Both properties are managed by the Nature Conservancy of Canada as part of an extensive conservation effort in the area which also includes lands owned by the Lake Simcoe Region Conservation Authority and Regional Municipality of York.

These properties are situated in the western extent of the Oak Ridges Moraine and are the headwaters of the Pottageville Swamp, which ultimately flows northward by way of the West Holland River into Lake Simcoe. Much of this rolling landscape had been cleared and farmed by early settlers, which soon resulted in the loss of topsoil and poor returns. The government purchased many of the denuded, sandy properties where today forest cover has now returned (albeit with some botanically interesting sandy openings scattered throughout). The Happy Valley Forest is one of ten core areas identified in the Oak Ridges Moraine Plan.

After a brief history of land acquisitions and conservation efforts in the area we were on our way. As is tradition with Steve's Mystery Tour trips, the group was tasked with compiling a species list for the property. The morning began by exploring areas of the Olamor property which were not scoured during the 2016 trip. Steve encouraged the group to "fan out" both to cover more area and minimize our footprint on some of the more sensitive forb-rich marsh inclusions.

Steve listed a few "notable misses", a number of which the group managed to locate in short order. A couple of tree parasite species started the day including Indian Pipe (*Monotropa uniflora*) and Beech Drops (*Epifagus virginiana*) which drew a victory cheer upon being located. The spotting of Beech Drops would come in handy later in the day for comparison with a rarity few people get to see.



Further down the trail a patch of a few dozen Indian Cucumber-root (*Medeola virginiana*) garnered the group's attention. This member of the Liliaceae family has an attractive nodding flower perched above a whorl of green to red leaves which resemble that of Small Whorled Pogonia (*Isotria medeoloides*).

The inconspicuous Autumn Coralroot (*Corallorhiza odontorhiza*) growing on a forest slope dominated by Sugar Maple (*Acer saccharum*). Photo: P. Deacon.

Indian Cucumber-root is uncommon in York Region and as the name suggests, the roots have the flavor of cucumber.

Soon after, a tuft-forming grass with a drooping inflorescence was pointed out at the edge of a wet depression. After some deliberation the group settled on Slender Wedgegrass (*Sphenopholis intermedia*). One can easily get flustered by graminoid identification; case in point the Michigan Flora key for *Sphenopholis* which differentiates species by the glume width being greater than or less than 0.3mm, upon which further differentiation is based on how scabrous the back of the lemmas are. On the recent Torrance Barrens field trip, Bill Draper introduced me to the Peak scale loupe, essentially a hand lens with a measurement scale bar in the field of view. While a hand lens does the trick most of the time, this gadget is certainly convenient when dealing with the measurement of very small features.

The group ticked a few more check boxes as the rich forest floor turned up Northern Maidenhair Fern (*Adiantum pedatum*), Shining Firmoss (*Huperzia lucidula*) and Blue Beech (*Carpinus caroliniana*).

Throughout the morning a few non-native invasive shrubs were encountered. A lone Autumn Olive (*Elaeagnus umbellata*) sapling was ruthlessly torn from the forgiving sandy soils. A clenched fist held a European Buckthorn (*Rhamnus cathartica*) shrub high above the head to a wave of jeers and hisses. Confirming that a *Sorbus* had a pubescent leaf underside indicated European Mountain-ash (*Sorbus aucuparia*) and not American Mountain-ash (*S. americana*). Wrong crowd: Steve unleashed the hounds who made mincemeat of the seedlings. This group was kicking *Asclepias* and taking names!

We needed to settle down. Fortunately a nearby patch of Dwarf Clearweed (*Pilea pumila*) initiated a discussion of the features, which distinguish this species from Lesser Clearweed (*P. fontana*). If you get your Peak scale loupe out you'll notice the former has yellow-green mature achenes with a width of 0.7mm up to 1.1mm; *P. fontana* has black or dark achenes measuring 1.1 to 1.4mm.

As we ascended to the top of a treed ridge, two additional regional rarities were found growing on a dry embankment. Lance-leaved Wild Licorice (*Galium lanceolatum*) which can be differentiated from Licorice Bedstraw (*G. circaezans*) by the lanceolate (not obovate-elliptic) leaves, glabrous (not pubescent) internodes, and maroon (not green) corolla. A few clumps of Selkirk's Violet (*Viola selkirkii*) were identified by the overlapping lobes at the base of the leaf as well as the minute hairs on the upper side of the leaf. Many of the plants had borne fruit with the three-sided pods bursting with tiny spherical seeds.

Emerging from the rich forest into an expanse of Kentucky Bluegrass (*Poa pratensis*) lawn, we reached a large excavated pond which could have been on the brochure for Ontario Regulation 97/04 (which regulates any development which would interfere with a wetland).

The fruits of Bare-stemmed Tick-trefoil (*Hylodesmum nudiflorum*). Photo: P. Deacon.

The overlapping leaf lobes of a fruiting Selkirk's Violet (*Viola selkirkii*). Photo: P. Deacon.

Despite being a bit of a mark on the landscape, the fringe of the pond made for some interesting botanizing. A few Loesel's Twayblade (*Liparis loeselii*) orchids bloomed along the fringe of saturated soils. The Natural Heritage Information Centre lists a record of the rare Purple Twayblade (*Liparis liliifolia*) observed in 2000 from the grid square overlapping the property; however the latter prefers much drier sites than the pond edge where we stood.

A young Pin Cherry (*Prunus pensylvanica*) on the bank of the pond had successfully dodged the mower to reach a few metres in height. This species thrives following fire or clearing and can be identified by the reddish bark of young stems, umbel of flowers/fruits and relatively long leaves.

Those wearing rubber boots and brave enough to wade into the pond were rewarded with a few aquatic species to add to the list including Slender Naiad (*Najas flexilis*), Sago Pondweed (*Stuckenia pectinata*) and Floating-leaved Pondweed (*Potamogeton natans*). The semi-aquatic Water Speedwell (*Veronica anagallis-aquatica*) was identified by the racemes of flowers, glabrous stems and sessile leaves. The less common American Brooklime (*V. beccabunga*) differs in that it has leaves which are all distinctly petioled.

Just before lunch we reached the Mary Lou Rose Property. A short distance down the trail a patch of Green-flowered Pyrola (*Pyrola chlorantha*) was pointed out. The round leaves of this species, about the size of a nickel, differ from Round-leaved Pyrola (*P. americana*) in that they have a dull surface and generally the leaves are shorter than the petioles.

Proceeding deeper into the forest, the group enjoyed a lunch break sitting on a cool, north-facing slope of Paper Birch (*Betula papyrifera*).

After lunch we entered a mature stand of Sugar Maple (*Acer saccharum*) where trees towered above us on both sides of the trail. Soon after, a strange plant that had the flowers of Broad-leaved

Helleborine (*Epipactis helleborine*) and the stem of Beech Drops was pointed out. As the group converged on the spot murmurs of "Ohhh!" and "Is that...?" could be heard. We weren't looking at Purple Twayblade but rather Autumn Coralroot (*Corallorhiza odontorhiza*); a rare orchid with fewer than 20 known occurrences in the province, and a new record for York Region. Among other Coralroot species in Ontario, this one is the latest to bloom. Michigan Flora Online notes that Autumn Coralroot has a preference for dry open oak forests and pine plantations making this occurrence among Sugar Maple somewhat atypical.

The new sightings on the day that followed included Eastern Rose Twisted-stalk (*Streptopus lanceolatus* var. *lanceolatus*), a species more associated with northern forests, and Hickey's Tree-clubmoss (*Dendrolycopodium hickeyi*). After the Autumn Coralroot, it was kind of like seeing the Rolling Stones do an epic 10-minute rendition of "Angie" only to be followed by Randy Bachman doing a sound check of "Takin' Care of Business".

As the group made the decision to wrap up the day and head back, a single Bare-stemmed Tick-trefoil (*Hylodesmum nudiflorum*) was spotted. The plant was growing in a topographic depression beneath a homogenous stand of Eastern Hemlock (*Tsuga canadensis*) with almost no other herbaceous species present. This legume resembles Pointed-leaved Tick-trefoil (*Hylodesmum glutinosum*) but differs in that it has longer pedicels, the stalk almost always lacks leaves, and the terminal leaflet is about 20% longer than broad (as opposed to being almost as long as broad in *H. glutinosum*). Bare-stemmed Tick-trefoil is ranked as R1 (1 recent station) in York Region (Varga 2000).

We meandered our way back across the hills and valleys of the two properties and back to the vehicles. A big thank you to Steve for leading a fun day out. ❊

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Botanical roots

"A Profitable Growing Site" – A look at vascular epiphytes in Ontario

By W.D. McIlveen

"A --- symbiosis (of several plants) occur in the most varied arrangements, it is the most extreme in those plants, which have settled on the surface of others, without finding anything but a profitable growing site" – K. Goebel, 1889.

Epiphytes are mostly defined as plants that grow on other plants, not parasitically, but for support. Mosses, lichens, fungi and algae would certainly qualify as epiphytes but the coverage in the present report is restricted to only those species with a vascular system. Such species are subjected to a novel suite of environmental constraints not faced by their more typical terrestrial counterparts. The constraints include limitations with respect to water balance and mineral nutrient pools that subsequently affect biological functions including reproduction and evolution.

In most examinations of vascular epiphytes, the discussion soon mentions the great abundance and diversity of this plant form in tropical settings. In a 'jungle' setting, there are numerous ferns, bromeliads, orchids and others that occur on the trunks and branches or trees. Up to one-third of the total vascular flora in some tropical forests can be made up of epiphytes [Benzing, 2008]. The more tropical parts of North America (e.g. Florida) have large numbers of epiphytic plants. Craighead [1963] indicates that 74 such species have been found in the Everglades National Park. Lichvar *et al.* [2011] noted 192 epiphyte species had been listed in wetlands in the United States though these species come from sites in Hawaii, Virgin Islands, and Puerto Rico in addition to the North American mainland. Interestingly, true or obligate epiphytes are excluded in the National Wetland Species List. To be included, plants need to be growing in soil. There is little doubt that the frequency of epiphytes decreases with latitude and with altitude. The rate of decrease with those gradients is such that the topic of epiphytes in our part of the world is almost dismissed out of hand. It is hoped that the present report will contribute to correcting this misunderstanding.

Only one study of epiphytes in Ontario [Maycock, 1975] was found in the literature and that information was published forty years ago. That

study found 25 species that exhibited epiphytic tendencies yet left the impression that the condition was rather rare. In total, he only discovered 34 situations with tree/epiphyte combinations in Southern Ontario. The present investigation found the condition to be somewhat more common.

Methods

Casual observations had indicated that several epiphytes were present in a number of locations on larger trees in our area. A simple survey strategy was developed in which epiphytes were documented. The target was to located 100 trees with epiphytes. The majority of these were readily found in Eramosa Township located east of Guelph. Others were found in adjacent Erin Township and Esquesing Township plus a few incidental locations. Most were along the quiet country roads where access to the trees was convenient not to dismiss the fact that traffic there was less of a safety concern. The majority of the trees examined would have been planted in the late 1880s [McIlveen, 2007].

When a tree with an epiphyte was located, its location and geographic coordinates were recorded and a photograph was taken for reference. The species of epiphytes were recorded and the approximate height above ground was noted. On some trees, more than one discrete group or location had epiphytes so these were recorded separately. The information was tallied and summarized. In addition to the formal survey of 100 trees, some subsequent observations of epiphytes were made on an incidental basis. This extra information was not included in the frequency of occurrence calculations but the species were included in the full list for the year.

Results

In total, 100 trees with living vascular epiphytes were observed during late August and early September, 2015. The majority (93) of the trees were Sugar Maple (*Acer saccharum*). The other host trees included two each of White Ash (*Fraxinus americana*) and Silver Maple (*Acer saccharinum*), with single representations of Freeman's Maple (*Acer* x *freemanii*), Wild Black Cherry (*Prunus serotina*) and Ironwood (*Ostrya virginiana*). It is believed that nearly all of the trees were planted though a few of the miscellaneous species might have been of natural origin. One tree was located in an urban street setting. All others were in a rural setting or at least were so when the trees were planted. Measurements of the host trees were not made (except for one particularly large Ash at 111 cm DBH) but the vast majority of trees had DBH measurements in the range of 75 to 100 cm. A number of trees showed indications of pruning (old saw marks), former dead branches, and broken sections, all of which could have been ports of entry for decay fungi. Some epiphytes were growing at locations where the history of the particular position was less obvious but it is a reasonable assumption that the underlying wood tissue was also in a state of decay.

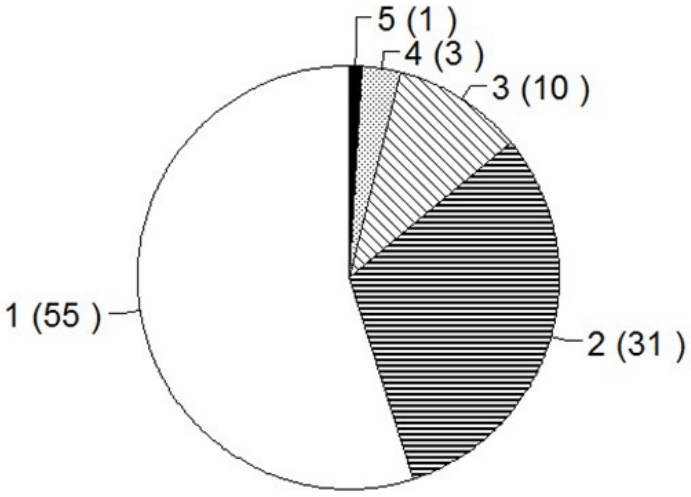

Figure 1. Number of epiphyte species per tree from Central Ontario survey of 100 trees, 2015.

Although the majority of situations (72%) involved single groups of epiphytes, twenty trees had two distinct and separate groups and the remaining trees had three, four, or even five groups. Fifty-five trees supported only a single species of epiphyte. The rest of the trees supported two to five species (Figure 1). As well, some species were present in more than one location on a given tree. Most of the epiphytes were present at three to five metres above ground level (Figure 2); however, the height ranged from one to twelve metres.

In total, twenty-seven species were identified among the epiphytes seen though one herb could not be identified. The *Poa* was not identified to species but was likely *Poa compressa*. The list (Table 1) indicates that the epiphytes included three grasses, fourteen herbs, five shrubs, two trees, and three vines. In total, the survey provided a total of 181 species-site encounters with epiphytes. The most frequent species noted (35 encounters) was Prickly Gooseberry (*Ribes cynosbati*). Some of these shrubs were quite large and multi-branched indicating that the plants had been growing in that location for many years. The other common species were Wild Red Raspberrry (*Rubus idaeus* ssp. *strigosus*), Black Nightshade (*Solanum ptychanthum*), Climbing Nightshade (*Solanum dulcamara*), and White Goosefoot (*Chenopodium album)* with 27, 25, 19 and 14 encounters each. Some of the most common species are shown in Figure 3 and Newsletter front cover. Other species were less commonly seen but most were observed

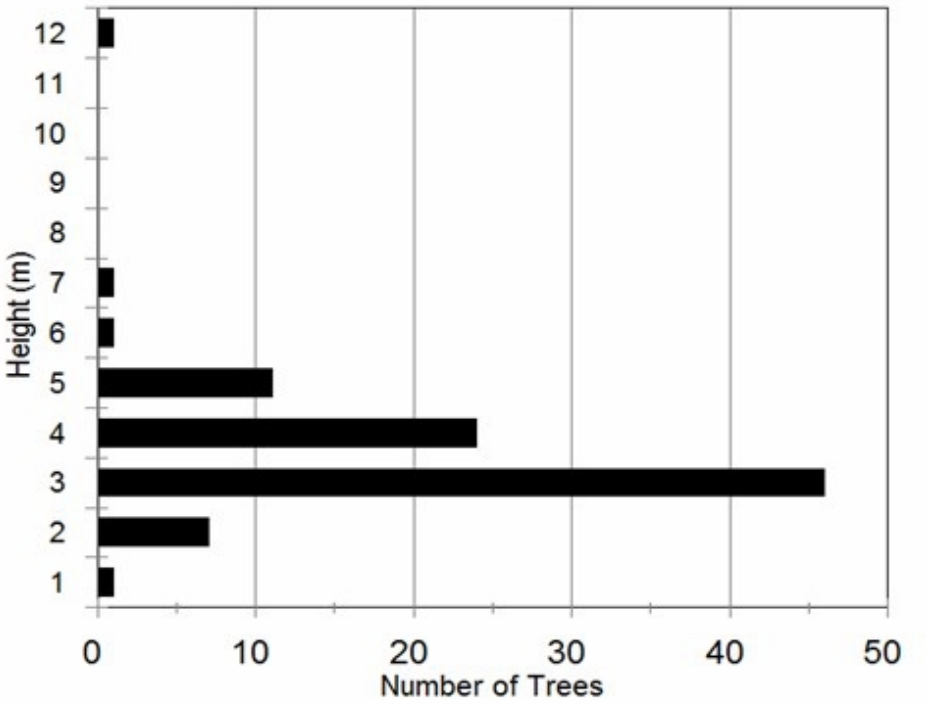

Figure 2. Distribution of epiphyte position heights from Central Ontario survey of 100 trees, 2015.

multiple times. Several additional species were recorded during the incidental observation period.

There is some overlap between the epiphytic species reported by Maycock [1975] and the present project. Ten of the species (with scientific name updates) reported by Maycock were noted during the present survey. The species common to both included White Goosefoot, Bluegrass sp. (*Poa* sp.), Wild Black Currant (*Ribes americanum*), Prickly Gooseberry, Wild Red Raspberry, Red Elderberry (*Sambucus racemosa*), Climbing Nightshade, Black Nightshade, Canada Goldenrod (*Solidago canadensis*), and Common Dandelion (*Taraxacum officinale*). It is interesting to note the most common species was Prickly Gooseberry in both studies and in fact the four most-common species were shared by both.

Maycock's report covered epiphyte sightings in two general area categories, namely Point Pelee, and also over a wide geographic including sites in Peel, Middlesex, Simcoe, Gogama and Haliburton. The wide area in the latter group turned up just 20 epiphyte records. This gives the impression that the occurrence of epiphytes is very low. All of the species seen during the present investigation are included in Table 1. Table 2 includes the additional species reported by Maycock as well as some incidental records from the author's records but not included in the 100-tree survey.

Maycock stated that the earlier literature had indicated there were 18 species of epiphytes in North America. To this list, his studies added another 21 species. These are all listed in Table 2. Because his surveys found a total of 25 species, there were four species that were common to both. It was not stated which ones these were. The present investigation (survey plus casual observation) found 34 species of which 24 have not previously been identified as epiphytes (Table 2). At present, the known list for temperate North America stands at no less than 64 species. Based on the ease with which epiphytes were observed, it would appear that the list could readily be increased even further.

Following the formal survey, it was noted that the same type of epiphytes were widespread and could be readily seen almost anywhere while driving along roads in both rural and urban settings. The prime requisite appears to be a tree of medium size with appropriate branching arrangements or cavities in forks or old branch sites. The most frequently identified species seen during such incidental observations were typically Gooseberry, Raspberry, and the two *Solanum* species.

Discussion

The reported numbers of epiphytic species in temperate North America is surprisingly small. The review by Zotz [2015] reported only seven species, six of which were ferns, based on one reference. Maycock [1975] found 25 species. Johnson [1921] only reported one species, *Polypodium virginianum* (formerly *P. vulgare*) growing on tree trunks. Brown [1921] studied the epiphytes on trees in New York State. The vast majority of the species she studied were lichens and bryophytes but three ferns (*Dryopteris marginalis, Dryopteris carthusiana, and Polypodium virginianum*) were included.

For purposes of the present study, four classes of epiphyte were recognized though only one of these classes was observed. The four types include 1) plants that receive all of their nutritional requirements from the air; 2) plants that root in soil and debris that gets trapped in fissures in the bark; 3) parasitic plants that receive all of their requirements from a host plant (e.g. mistletoes) and 4) plants that are able to become established in pockets or cavities in rotted wood and debris that accumulates in that cavity. Such epiphytic plants are not directly connected to the soil. It could be

reasonably argued that there a fifth category or possibly a temporary sub-category of the fourth type due to the nature of the organic substrate involved. In this latter group are those seedlings of trees such as Eastern Hemlock, Yellow Birch or Blue Beech that establish themselves on stumps, grow their roots through the old stump, and then eventually form stilt-rooted trees. For the first few years, such plants are not rooted in the soil.

Figure 3. Climbing Nightshade as an epiphyte on Sugar Maple, Eramosa Township, August 2015. Photo: B. McIlveen.

The majority of species observed during the present survey appear to be plants that opportunistically grow in cavities or pockets containing organic matter mostly derived from the woody tissues that once occupied that space. The plants establish a normal root system that obtains the required nutrients and water from within the organic matter. As long at the nutrient supply is adequate, the plants continue to grow and reproduce normally as the species is programmed to do. All are normally found growing in soil.

Some general requirements for the formation of an epiphytic relationship are mentioned by Callaway *et al.* [2002] and Bartels and Chen [2012]. A review of the literature by Wagner *et al.* [2015] suggests that epiphytes are not host-specific but that bark characteristics and crown characteristics are likely important in determining the success of establishment of epiphytic plants. There are two main factors that determine whether or not an epiphytic relationship becomes established. These include the availability of a suitable site and then whether a seed reaches that site. Each of these in turn has several component conditions that need to be met. The cavity first must contain organic matter in which a plant can grow. It is expected that the size of the growing cavities varies widely. Secondly, the contents must be reasonably close to the surface so that growing plants can access light. There must be a reasonably-acceptable level of mineral nutrients in the decaying wood filling much of the cavity. Wood in general does not contain large quantities of nutrients and is especially likely to be deficient in nitrogen. Some of the essential elements could be supplied by rain though given the size of typical openings, it cannot be expected that precipitation would directly provide any large quantities of the needed materials. A more likely source of nutrients and water is likely from stemflow water. Stemflow is that water in precipitation that is intercepted by the tree crown then flows down the trunk. If the flow happens to be properly directed to the cavity, then the epiphytes there can receive adequate moisture and nutrients. Much work has been carried out with respect to stemflow chemistry, often in connection with acidic precipitation studies [Neary and Gizyn, 1994]. Of all the trees observed during the present investigation, only one (involving Ironwood as the host) showed epiphytes that were decidedly wilted. This indicates that in this particular year, moisture was not limiting in most situations. In general though, plants had foliage that was somewhat smaller than one would expect on healthy plants growing on a good soil site. This may reflect the limited nutrient supply available or perhaps a limited supply of water. In many cases, the plants were observed to flower and produce fruit normally. It is interesting to note though that none of the epiphytes reported on the updated list for North America are species that can fix atmospheric nitrogen (e.g. legumes).

The entire list of North American epiphytes includes nine tree species. The present study found five of these. Three of these were from an incidental observation of small White Mulberry (*Morus alba*), Manitoba Maple (*Acer negundo*) and Sugar Maple (*Acer saccharum*), all in one position on a Honey Locust (*Gleditsia triacanthos*). The plants involved were all still quite small but potentially each of these could grow to be much larger than their

host though not in their present position. The other two tree species were found during the formal survey including two Common Buckthorn (*Rhamnus cathartica*) and four European Mountain-ash (*Sorbus aucuparia*). Interestingly, the latter was also reported as an epiphyte in the European literature [Maycock, 1975]. Some members of these two species were at least in the size range for woody shrubs. It is not known how large these trees might become. One of the Mountain Ash was large enough to produce its own fruit. It is most unlikely that these trees will ever achieve their full growth potential simply because they will have a limited source of nutrients within the confines of the pocket within which they are growing.

Although growing sites were not exclusively limited to Sugar Maple (Maycock cited 13 species as hosts), the present survey found that the distribution of host trees was highly skewed towards that species. Several factors likely contributed to that pattern. There is little doubt that the arrangement of trees in rows along the roadsides facilitated the survey. Sugar Maple was the species of choice when the trees were planted about 140 years ago so they were typically the most abundant within the survey area. As well, the crown architecture of open-grown trees at this age appears to be optimal for the formation of growing places for the epiphytes. This is enhanced by the history of pruning of the branches to accommodate power lines, removal of dead and damaged branches due to disease, wind or ice. The net result is that Sugar Maple offers the greatest potential of any species for the development of growing sites for epiphytes.

A second obvious requirement for an epiphyte to become established is for a seed to reach the growing site on the host tree. In most cases, most of the plants that have been observed as epiphytes are much shorter than most of the heights of the growing position. This raises the question as to how they reached their destination. For some, this is not difficult to imagine. These would be the wind-disseminated species that have plume-like structures to aid in their dispersal. These include Canada Thistle, Small-flowered Willowherb, Common Nipplewort, Canada Goldenrod, and Common Dandelion. Ten species (Table 1) have fleshy fruits (berries, drupes, pomes) that could not be dispersed by the wind. As suggested by Maycock, these were likely dispersed by birds or perhaps mammals. Most of this group of plants are widely used by birds [Degraffe and Whitman, 1979]. Two of the vines recorded (Wild Mock-cucumber and Thicket Creeper) are species that, in the past, could potentially have used the tree as supports to attain the growing sites observed.

In the grand scale of things, the observed epiphyte relationships reported here likely fall into the category of 'interesting' to botanists rather than into a category where the relationship is critical to some species or other. The plants involved do occur rather widely and abundantly, perhaps too well in some cases involving invasive species, where the plants would normally grow in soil. By comparison, the epiphytic relationship is crucial to parasitic species such as Dwarf Mistletoe though the relationship may be viewed rather negatively by certain interest groups that rely on the host trees from an economic perspective. By comparison, the ecological role of epiphytes is much more important in warmer regions where the condition is much more common and plays a much greater role in the natural functioning of the terrestrial ecosystem. In spite of this, the situation with respect to epiphytes in Ontario has been determined to be more widespread than previously suggested. Most of the surveillance took place in small portions of only two townships in south central Ontario. It should therefore be easy for botanists in the field to locate additional host tree species and to increase the list of epiphytes that occur here. ❊

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Table 1. Summary of epiphyte encounters from survey of 100 trees in Central Ontario, 2015.

Latin Binomial	Common Name	Form	Encounters +	Fruit
Bromus inermis	Awnless Brome	Graminoid	6	Caryopsis
Poa sp.	Bluegrass sp.	Graminoid	6	Caryopsis
Setaria pumila	Yellow Foxtail	Graminoid	3	Caryopsis
Cerastium fontanum	Common Mouse-ear Chickweed	Herb	1	Capsule
Chenopodium album	White Goosefoot	Herb	14	Achene
Circaea canadensis	Broad-leaved Enchanter's Nightshade	Herb	2	Capsule
Cirsium arvense	Canada Thistle	Herb	1	Cypsela
Epilobium parviflorum	Small-flowered Willowherb	Herb	1	Capsule
Fallopia scandens	Climbing False-buckwheat	Herb	2	Achene
Geum aleppicum	Yellow Avens	Herb	1	Achene
Impatiens capensis	Spotted Jewel-weed	Herb	1	Capsule
Lapsana communis	Common Nipplewort	Herb	1	Cypsela
Persicaria maculosa	Spotted Lady's-thumb	Herb	1	Achene
Solanum ptychanthum	Black Nightshade	Herb	25	Berry*
Solidago canadensis	Canada Goldenrod	Herb	2	Cypsela
Stellaria media	Common Chickweed	Herb	2	Capsule
Taraxacum officinale	Common Dandelion	Herb	9	Cypsela
Cornus stolonifera	Red-osier Dogwood	Shrub	2	Berry*
Ribes americanum	Wild Black Currant	Shrub	5	Berry*
Ribes cynosbati	Prickly Gooseberry	Shrub	35	Berry*
Rubus idaeus ssp. strigosus	Wild Red Raspberry	Shrub	27	Drupe*
Sambucus racemosa	Red Elderberry	Shrub	1	Drupe*
Rhamnus cathartica	Common Buckthorn	Tree	2	Drupe*
Sorbus aucuparia	European Mountain-ash	Tree	4	Pome*
Echinocystis lobata	Wild Mock-cucumber	Vine	4	Pepo
Parthenocissus inserta	Thicket Creeper	Vine	4	Berry*
Solanum dulcamara	Climbing Nightshade	Vine	19	Berry*

* Fleshy fruit
\+ Encounters are based on the presence of the species at a given location. Multiple sites per tree are possible.

Table 2. List of epiphyte species known from North America.

Species	North America*	Maycock	2015**
Acer rubrum	+	+	
Acer negundo			+
Acer saccharum			+
Alliaria petiolata			+
Betula lutea	+		
Bromus inermis			+
Campanula americana	+	+	
Carex blanda	+	+	
Cerastium fontanum			+
Chenopodium album	+	+	+
Circaea canadensis			+
Cirsium arvense			+
Cornus canadensis	+	+	
Cornus stolonifera			+
Diervilla sessil~~olia	+		
Dryopteris carthusiana	+	+	
Dryopteris clintoniana			+
Dryopteris marginalis	+		
Echinochloa crus-galli			+
Echinocystis lobata			+
Epilobium parviflorum			+
Fallopia scandens			+
Galium aparine	+	+	
Geranium robertianum	+	+	
Geum aleppicum			+
Geum canadense	+	+	+
Heuchera villosa	+		
Impatiens capensis			+
Lapsana communis			+
Morus alba			+
Muhlenbergia frondosa	+	+	
Parietaria pensylvanica	+	+	
Parthenocissus inserta			+
Persicaria maculosa			+
Picea rubens	+		
Pilea pumila	+	+	
Poa compressa	+	+	+
Polypodium polypodioides	+		
Polypodium scouleri	+		
Polypodium virginianum	+	+	
Polypodium vulgare	+		
Pteridium aquilinum	+	+	
Ranunculus abortivus	+		
Rhamnus cathartica			+
Rhododendron maximum	+		
Ribes americanum	+	+	+
Ribes cynosbati	+	+	+
Rubus canadensis	+		
Rubus idaeus ssp. strigosus	+	+	+
Sambucus racemosa	+	+	+
Setaria pumila			+
Solanum dulcamara	+	+	+
Solanum ptychanthum	+	+	+
Solidago caesia	+	+	
Solidago canadensis	+	+	+
Sorbus aucuparia			+
Stellaria media			+
Taraxacum officinale	+	+	+
Thalictrum dioicum	+	+	
Thuja occidentalis			+
Tillandsia usneoides	+		
Tsuga canadensis	+		
Veronica officinalis			+
Total	39	25	35

*North American species includes species reported by Maycock, 1975
** 2015 = species observed during survey of 100 trees plus incidental notes

Registration is now open for two **2018 Plant Identification (I.D.) workshops***, both of which will be held in Michigan's western Upper Peninsula near the shores of scenic Lake Superior on:

1. Isle Royale National Park (June 4-9), based at Rock Harbor, and
2. Keweenaw Peninsula (July 24-26), based in Copper Harbor, Michigan's northernmost village.

This is an excellent chance to visit a remote and wild portion of the northernmost part of Michigan near Lake Superior and learn the flora of the area at the same time. Both of these workshop locations feature rugged bedrock shorelines, ridges (with amazing views!), forests, and wetlands, which provide diverse habitat for numerous plant species, including boreal species and rare arctic disjuncts.

1. Isle Royale Plant I.D. workshop: This will be the 14th Plant I.D. workshop sponsored by IRKPA* that will be taught in Isle Royale National Park.
Dates: June 4-9
Fee: US$699 ($25 discount for IRKPA members) NOTE: In addition to three days of instruction, the fee includes all meals from Tuesday lunch - Saturday lunch, transportation between Houghton MI and Isle Royale via the National Park Service ferry Ranger III (and while on Isle Royale), camping in a group campsite, park fees, and two IRKPA publications.

For more detailed information about Isle Royale (including map), workshop activities, evening options, instructor's background, workshop fee, cancellation policy, and how to register, please click on the flyer at: http://irkpa.org/get-involved/workshops

2. Keweenaw Plant I.D. workshop: This will be the second year that an IRKPA-sponsored plant I.D. workshop will be taught in the Keweenaw, a picturesque peninsula on Michigan's Upper Peninsula that juts out into Lake Superior.
Dates: July 24-26
Fee: US$375 ($25 discount for IKRPA members)

For more detailed information about the Keweenaw (including map), workshop activities, evening options, instructor's background, workshop fee, cancellation policy, and how to register, please click on the flyer at http://irkpa.org/get-involved/workshops

If you have questions or would like more information on either of these workshops, please contact Janet Marr, Botanist and workshop instructor, at jkmarr@mtu.edu or phone 906-337-5529 (landline).

Passing of Kent Glauser

The FBO is much saddened to learn of the passing of Kent Glauser. He died in his home in Northwood, Ohio, on November 17, 2017 after a long illness. He was 82. Kent and his wife Delores were among those that attended the first FBO event on the Bruce Peninsula in 1984 making them among the charter members of the organization. Every year, they would faithfully renew their membership in FBO. In fact, they may be the longest continuous members of FBO or are among the very few that were at the first meeting and are still members today. Of the half dozen or so people that hold that distinction, some of them had a short hiatus in their status, but Kent and Delores were certainly in the continuous category.

Kent was a florist by profession but a naturalist by preference. He had many community interests and wrote articles for various organizations. He led trips in his native Ohio, Michigan and Ontario. Kent and Delores had not been able to attend FBO events for a number of years now but were always interested in the activities of the organization. For those old friends that do remember him, there is an extended obituary notice in the Toledo Blade Newspaper which is easily accessible by an internet search.

The FBO wishes to congratulate our member, Joe Johnson on receiving the 2017 Ian Shenstone Fraser Memorial Award at the Ontario Nature AGM at Lake Simcoe. The award was given in recognition of his outstanding work that includes his contribution to numerous life science reports for the Ministry of Natural Resources and Forestry. It also recognizes his recent book "**The Vascular Plants of the Bruce Peninsula, Ontario**". Well done Joe!