FIELD BOTANISTS of ONTARIO
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Tony Reznicek with a sample of the rare Showy Goldenrod (*Solidago speciosa*). Credit: Paul O'Hara

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Newsletter

President's Message

Early in the spring I go to a particular spot on the shore of Lake Ontario and look to see if Coltsfoot (*Tussilago farfara*) is in bloom. When I find one I know that Spring has officially arrived. Its too early to go to the lakeshore but I have just finished a short tour of my garden and was pleased to see healthy leaves of Golden Corydalis (*Corydalis aurea*), Wild Garlic (*Allium canadense*), Early and Prairie Buttercup (*Ranunculus fascicularis* and *R. rhomboideus* and a couple of tiny shoots on my Compass Plant *(Silphium laciniatum*). Thus, I have decided that Spring has officially arrived at the end of the third week of March.

When Cheryl Hendrickson took over the Editor's job she did so on the premise that she would do so for one year. However, she lasted longer than one year and found the job became more rewarding with each issue. This issue will be Cheryl's last. Over the years I have found that publications frequently take on the character and personality of their Editor and I think Cheryl's tour is proof of this observation. I wish to express the appreciation of the FBO to Cheryl for her dedication and fine work as our Editor. You have done a great job, Cheryl, and we wish you every happiness in your new home.

Fortunately, we have a new *Newsletter* Editor. Julia Marco Dunn, who joined the Board last September, has volunteered to take on the job. Julia works for the Rare Charitable Research Reserve. She has some experience in editing which is great news for us scientists with weak spelling and grammar. Welcome aboard Julia. I know that our members will give you their full support.

In my last message I mentioned that we may be having an indoor meeting in the Spring. I can now advise that it is very possible we will have a meeting in April 2011 at the Canadian Museum of Nature in Ottawa. The museum is a national treasure and the herbarium is outstanding. There are a number of experts at the museum and in the Ottawa area who, I understand, are willing to assist us in putting on a first class program.

I hope to see many of you on field trips this summer and at the AGM which is being held in the Gravenhurst area on September 11 and 12.

Bill Crowley
President

Standard source for most scientific names and authorities of vascular plants:

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Field Trip Reports

Good Plants Gone Bad

Rattray Marsh Conservation Area, Mississauga

July 25, 2009

The group gathered in the Green Glade School parking lot on the south side of the Conservation Area, applied insect repellent, packed lunches and raingear, made introductions, and then promptly chose me as the scribe. As this was my first field trip I guess I didn't know to look busy at the appropriate time like everyone else! Lesson learned. Our guides, Bill McIlveen (FBO) and Rod Krick (Credit Valley Conservation) then gave us some interesting background on the Conservation Area including its history and present day management efforts.

In the early 1900s, the area was occupied by the Fudger Estate, which was later bought by Major James Rattray, a gold mining industrialist. Land usage on the property was mainly agricultural. Following the Major's death in 1959, the marsh was proposed for development until a movement spearheaded by Dr. Ruth Hussey succeeded in protecting the marsh as natural area. Credit Valley Conservation (CVC) acquired the area in 1976 and has been managing the area in cooperation with local volunteers ever since.

Presently, the conservation area, which is designated as an ANSI (Area of Natural and Scientific Interest), ESA (Environmentally Sensitive Area), and PSW (Provincially Significant Wetland), is an approximately 42 hectare natural area located on the shore of Lake Ontario. Sheridan Creek controls the drainage throughout the site, winding its way through remnant forest and swamp before emptying into Lake Ontario. The marsh proper, located at the mouth of the creek, is the sole remaining lakefront marsh between Burlington and Toronto. Being surrounded on 3 sides by residential development, the conservation area receives considerable anthropogenic pressure including sedimentation of the marsh and the focus of this trip - the intentional and accidental introduction of non-native species.

As outlined by Rod, CVC has inventoried and mapped the invasive species present throughout the conservation area and delineated high priority areas for management and control in order to protect native plants and vegetation communities that are rare in the Credit Valley watershed. The assemblages of exotics vary across the conservation area necessitating many different management strategies. The purpose of the day was to have a look at the countless non-native species present in the conservation area as well as the efforts used to control them. Of course, we couldn't help but identify loads of native species along the way too! Notably, Bill promised a glimpse at no less than five non-native maples (*Acer* spp.) on the tour. At the time, I could only think of four alien maples so I was eager to expand on my meagre botanical knowledge.

The tour began on a well-worn path that leads away from the school. Almost immediately Bill was pointing out the multitudes of non-native species present including Garlic Mustard (*Alliaria petiolata*), Honeysuckles (*Lonicera* spp.), Motherwort (*Leonurus cardiaca* ssp. *cardiaca*), Multiflora Rose (*Rosa multiflora*), Oriental Bittersweet (*Celastrus scandens*), Little Leaf Linden (*Tilia cordata*), *Euonymus* sp., Dame's Rocket (*Hesperis matronalis*), and Common Buckthorn (*Rhamnus cathartica*). The scale of the alien invasion was quickly becoming clear. A little further along we traveled through a nice little portion of remnant upland White Pine (*Pinus strobus*), Red Oak (*Quercus rubra*), and Eastern Hemlock (*Tsuga canadensis*) forest and got our first look at a high priority management area. Rod explained that they have been successfully reducing the exotic honeysuckle population from this remnant through both chemical application on individual stems and pulling by hand. It seemed the tedious work was paying off, as there were very few honeysuckles evident from the path. When asked what happens after the exotics have been removed, Rod explained that site is planted with native species propagated from seed collected from the conservation area. In a great example of community engagement, the seeds are collected and propagated by 20 local volunteers.

The path then led us down to our first glimpse of Sheridan Creek. From here, boardwalks installed by CVC allowed us to walk through floodplain and swamp along the creek (as well as the marsh itself) without damaging the flora and fauna. In the floodplain, Rod pointed out a relatively large patch of the exotic Tall Manna Grass (*Glyceria maxima*). A big concern with this species is the dissemination of seed by the creek to downstream areas. As the grass thrives in full sun, one potential solution is to plant native shrubs in likely downstream areas to prevent its spread.

Bill used this portion of the tour to discuss (and show) some of the non-native fauna that has been intentionally or accidentally introduced to the area including English Garden Snail (*Cepaea nemoralis*), Four-lined Plant Bug (*Poecilocapus lineatus*), Japanese Beetle (*Popillia japonica*), Imported Willow-leaf Beetle (*Plagiodera versicolora*), Zebra mussel (*Dreissena polymorpha*) and Quagga mussel (*Dreissena bugensis*), as well as various slugs, fish, and earthworms. Discussions centered on the effects these various organisms have on the local ecology. Bill showed us leaf skeletonizing of various willows (*Salix spp.*) and other plants caused by the insects but we also chatted about the successful introduction of loosestrife beetles (*Galerucella* spp.) for the biological control of the invasive Purple Loosestrife (*Lythrum salicaria*). Rod explained that this technique has been so effective in the marsh that they are no longer focussing on Purple Loosestrife removal. Great to hear a "triumph" as there are bound to be a lot of failures and learned lessons along the way to a more native flora.

Next we made our way towards the marsh at the outlet of the creek. Along the way we traveled through swamp land and took in some non-native flora that appeared planted around a pumping station including English Ivy (*Hedera helix*), European Hornbeam (*Carpinus betulus*), and European Ash (*Fraxinus excelsior*). Abundant Black Alder (*Alnus glutinosa*) in the swamp near the pumping station provided Rod another

opportunity to outline the CVC's efforts. Their approach for this species is the application of the herbicide Garlon to individual stems. Unfortunately there seemed to be much more work needed to eradicate this alien.

After passing by a relatively large mound known as the "Knoll" (more on that later), the marsh opened up before us. Looking at an abundance of cattails (*Typha* spp.), I was impressed by the relative lack of Common Reed (*Phragmites australis*) in the marsh and soon found out how this was achieved. Rod pointed out a large gap in the cattails off in the distance. Turns out this 50 by 50 foot patch was filled with Common Reed before the CVC cut it down and smothered it with a tarp. The tarp is to be left in place for a few years to ensure the roots are killed and then the area is left to regenerate or planted with cattails. In this way, about 95 percent of the reed's biomass is eliminated.

We wound our way around the marsh and then walked along the Lake Ontario shoreline where a shingle beach bar vegetated with Balsam Poplar (*Populus balsamifera*), Eastern Cottonwood (*Populus deltoides ssp. deltoides),* and their hybrid, Jack Aspen (*Populus x jackii*) separates the marsh from the lake. Bill informed us that the shingle bar comes and goes with the weather thereby varying the water levels in the marsh. Although the marsh usually contains shallow water, it turns into a mudflat when it drains – a result of high sediment loading during the development of the surrounding lands. Part of the overall rehabilitation strategy for the marsh is to dredge the sediment thus increasing its mean water level.

We broke for lunch in the Jack Darling Municipal Park that is adjacent to the conservation area and chattered about botany, careers, and the state of the world. Some of us noted the incongruity of this land use juxtaposed with the neighbouring marsh. Here, the park consisted mainly of manicured grass that extended close to the lake. Even a drainage swale leading towards the lake was manicured! Wouldn't native plantings cut down on maintenance costs along with their more obvious benefits? Oh well, back to the trip…

Next on the agenda was the aforementioned Knoll. This area was identified as a high priority management area as it contained abundant invasives as well as native species rare in the Credit Valley watershed. Common Buckthorn and Garlic Mustard used to dominate the Knoll but through dogged hand-pulling and brushing of herbicide, their absence was conspicuous. We took advantage of an opportunity offered by Rod to leave the beaten path and further explore the Knoll. Near its crest, Rod showed us some Aniseroot (*Osmorhiza longistylis*), one of the rare watershed species now doing fine without the alien competition. According to Rod, Purple-stem Angelica (*Angelica atropurpurea*), Rose Twisted Stalk (*Streptopus roseus*), and Cow-parsnip (*Heracleum lanatum*), observed in other parts of the conservation area along the walk, also belong in this category. Other native species happily growing in the Knoll management area include two of my favourites – Indian-pipe (*Monotropa uniflora*) and Interrupted Fern (*Osmunda claytoniana*).

The clouds were threatening (as they did most of the summer) so we started to pick up the pace. We were still dry and in good spirits and Bill assured us there was more to see. We passed by the pumping station and all its exotics again on our way back to the perimeter of the conservation area. Along the way, we spotted a Butternut (*Juglans cinerea*). Interesting to get a rare find among all these invasives. The rain started to come down and, as we were near the end of our day, Bill decided to just show us a few more exotics. We hadn't yet seen all of the five non-native maples and he was eager to live up to his promise. Sure enough, among oodles of horticultural escapees from the rear of adjacent residential properties, the remaining three maple species were found.

The day was a good lesson in the challenges faced when managing natural areas in an urban setting. These areas require constant management because as soon as you remove one exotic species another moves right in. Additionally, as the conservation area is so public, Rod often has to field inquiries as to why he is "killing plants" and putting down "ugly plastic". The CVC is dealing with this challenge through an ongoing process to educate the neighbouring residents and the public in general as to the problems posed by exotic and invasive species. Although the CVC and their dedicated volunteers may not ever be able to craft an entirely native flora in the conservation area, given the challenges they face, we should all applaud their efforts.

Oh yeah, the five non-native maples? Manitoba Maple (*Acer negundo*) (questionably native), Norway Maple (*Acer platanoides*), Sycamore Maple (*Acer pseudoplatanus*), Amur Maple (*Acer ginnala*), and Hedge Maple (*Acer campestre*). Now I know.

Jason Elliott (with thanks to Bill McIlveen)

Field trip reports continued on page 13

Notes on Mockernut Hickory (*Carya tomentosa*) in Ontario

The status of Mockernut Hickory (*Carya tomentosa*; sometimes known as *C. alba*, e.g. Kartesz 1999) in Ontario and Canada has been confused, with some authors attributing it to the flora of the province and others excluding it. As early as the late 1800s, Macoun (1886) reported *Carya tomentosa* as "rather sparingly distributed amongst the other hickories in the Niagara peninsula from Lake Ontario to Lake Erie, and extending westward to Windsor ...". Macoun (1893) stated that *C. tomentosa* was to be found in close proximity to Niagara Falls. Other publications listing or mapping the species from Ontario include Dodge (1914), Soper (1949), Fernald (1950), Fox and Soper (1954), Fowells (1965), Hosie (1969), and Little (1971).

During the preparation of the *Atlas of the Rare Vascular Plants of Ontario* (Argus *et al*. 1982-1987), Ontario hickory specimens labeled as *Carya glabra, C. laciniosa, C. ovalis*, or C. *tomentosa* from all major Ontario herbaria and several in the US were examined and no definite specimens of *C. tomentosa* were found. All Ontario specimens labeled as *C. tomentosa* were misidentified specimens of either *C. ovata* or *C. laciniosa* (P.W. Ball, personal communication). Wayne Manning also examined many *Carya* specimens from the northern US and southern Canada for his studies on the genus. Manning (1973a, 1973b) also concluded that all Ontario specimens of *C. tomentosa* were

misidentified, with one exception. A single incomplete specimen labeled as being collected by Macoun on 27 July 1887 (OAC 6117) from "shore of Lake Erie" might be *C. tomentosa*, however there is uncertainty both to the identity and label data of the specimen. The specimen is made up of a summer twig with two leaves and no fruit or buds or notes on bark and cannot be conclusively identified. Since Macoun collected a specimen of *C. ovata* from Belleville, Hastings County, on the same date (Manning 1973b), it is possible that the label data are confused, as is the case with other Macoun specimens.

Bert Miller who had a great interest in trees and botanized extensively in the Niagara Peninsula region found no Mockernut Hickory, despite investigating several reports (Manning 1973b). George Meyers who has also done a considerable amount of botanical inventory in the Niagara area focusing on trees has also not seen Mockernut Hickory in the wild (Meyers 2005a, 2005b, 2005c). Waldron (2003) noted that where *Carya tomentosa* had been reported in Ontario, individuals of *C. laciniosa* with non-shaggy bark had been found. He speculated that these atypical Shellbark Hickory trees were probably the source of confusion over the range of Mockernut Hickory. Waldron (2003) also pointed out that the illustration of Mockernut Hickory in the 1956 edition of "Native Trees of Canada" (Hosie 1956) is clearly a Shellbark Hickory and that the illustration in the 1979 edition (Hosie 1979) appears to have the nuts of Shellbark Hickory, the twig and buds of Pignut Hickory, and the bark of Bitternut Hickory. The species is not accepted as occurring in Ontario by Boivin (1967), Scoggan (1978), Argus *et al*. (1982-1987), Morton and Venn (1990), Gleason and Cronquist (1991), Farrar (1995), Flora of North America (1997), Newmaster *et al*. (1998), Kershaw (2001), Small and Catling (2005), or Oldham and Brinker (2009).

Although not confirmed as occurring in Canada, Mockernut Hickory is known from nearby New York state (Manning 1973b, Mitchell 1988) and given the early reports of the species, should be watched for in Ontario's Carolinian Zone. *Carya* species can be difficult to distinguish and identifications should be based on mature fruiting specimens with terminal buds. Bark characteristics are also important in identification and notes or photographs of bark should be included with specimens. *Carya tomentosa* is characterized by 7 to 9 leaflets, never 5 alone; lower surfaces of the leaflets always fascicled hairy and with yellow scales; serrations of the leaflets usually ciliate but lacking special dense subapical tufts of hairs; rachis and twig often but not always prominently fascicled hairy with curly hairs; twigs dark brown; branchlets stout; true terminal buds in winter subglobose, gray silky hairy without outer dark brown bud-scales (these having fallen off in late autumn); husk of fruit medium thick, dehiscent to the base of the fruit; nut brownish, angled, the style-like tip stout; bark of trunk tight, furrowed, not shaggy (Manning 1973b).

M.J. Oldham

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Wildlife Value of Black Alder (*Alnus glutinosa*) in Southern Ontario

Black Alder (*Alnus glutinosa*) was introduced into North American by European settlers 200 or more years ago. This tree originated in western and central Europe and Great Britain and other parts of the Old World. Lauriault (1989) writes that Black Alder was originally introduced into Canada for the production of charcoal. Other authors have suggested that the wood of this tree stands up well in wet conditions and that Black Alder wood was used in sluiceways and other water power components which drove the mills. I have noticed that in the Lake Erie drainage basin there are concentrations of Black Alder growing downstream of former mill towns.

Despite its historic value to industry, currently in Ontario Black Alder is considered to be an aggressive exotic species that can dominate a site to exclude all other plant species and remain dominant on the site indefinitely. It is also considered to be a top priority species for control (Urban Forest Associates Inc. 2002).

This tree has been planted at Hanlan's Point on Toronto Island and has been reported in Haldimand-Norfolk, Elgin and Oxford Counties (Soper and Heimburger, 1982). I have also observed it growing in Halton and Waterloo Regions and Brant, Elgin, Norfolk and Oxford Counties.

Alien plant species are frequently considered to have significant negative impacts on native flora, sometimes without detailed research to support this conclusion. Often the attitude is that alien plants play no positive role in the landscape.

During a period of 5 years, I walked our dog and watched birds and other wildlife along the banks of the Nith River, a tributary of the Grand River. I immediately noticed the frequent occurrence of Black-capped Chickadees (*Poecile atricapillus*) and other bird species in and around the Black Alders present. The use of Black Alder by wildlife was so extensive that I accumulated a considerable data set that was published in *Ontario Birds* (Dance, 2008).

During 163 visits I recorded the species, numbers, uses and behavior of the birds and other wildlife species present on or immediately adjacent to Black Alder stands. More than 95 percent of the observations were recorded in the Nith River valley at Wolverton, Blandford-Blenheim Township, Oxford County. Many observations were near the confluence of Wolverton Creek (a coldwater stream) and the Nith River. Less frequently observations were recorded at Glen Morris, Brant County; Otterville, Oxford County; Port Burwell, Elgin County; and Blair, Regional Municipality of Waterloo.

Eight bird species consumed the seed of Black Alder. Six bird species foraged on the boles or snags of these trees. The leaves, twigs and/or branches of Black Alder were the sites of 27 bird species foraging for arthropods. Forty-two bird species made other uses of Black Alder trees, e.g. perch sites, cover and/or nest sites.

Given that northern bird species are familiar with the native Green Alder and Speckled Alder (*A. viridis* and *A. incana)* which are widespread across vast areas of Northern Ontario to Hudson Bay, it is not surprising that migrant warblers (Parulidae), vireos (Vireonidae), and kinglets (Regulidae) forage in considerable numbers on Black Alder. Similarly, northern finch populations are familiar with *Alnus* species as a seed food source, so the large winter flocks of American Goldfinches (*Carduelis tristis*) and Pine Siskins (*C. pinus*) found feeding on Black Alder seeds in my study area is not unexpected.

I observed Black-capped Chickadees most frequently on Black Alders. This common, resident bird ate the seed, foraged for insects on most parts of the tree and nested. Other common birds which remain in Southern Ontario during the winter such as Downy Woodpecker (*Picoides pubescens*), White-breasted Nuthatch (*Sitta carolinensis*) and Brown Creeper (*Certhia americana*) also frequently search the surface of Black Alder for invertebrate prey.

Although the use of native alder trees and shrubs by wildlife has been described in the literature, I could find only one reference to Black Alder and birds in Ontario. Black Alder was described as one of nine or more tree and shrub species planted to widen the treed buffer along a stream located in Oxford County, Ontario. Followup bird surveys by the authors revealed that the number of bird species nesting and foraging in the rehabilitated areas was greater than in the control area. An autumn season survey revealed higher numbers of Blue Jays (*Cyanocitta cristata*), Song Sparrows (*Melospiza melodia*), Black-capped Chickadees, Cedar Waxwings (*Bombycilla cedrorum*) and Yellow-rumped Warblers (*Dendroica coronata*) present in a wide buffer planting than were present in the narrow buffer and control areas (Olebermann and Gordon, undated).

The distribution of Black Alder in the landscape is usually clumped or linear, being associated with moist soils. In the present study area (the valleys of streams and rivers that flow south into Lake Erie) Black Alder is concentrated along known bird migration routes and bird overwintering habitats. This tree species, thus, plays a significant role in the provision of food and cover to resident, migrating and overwintering birds.

Ken Dance

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Goldie Award Recipient Dr. John Morton

Dr. John Morton is Director Emeritus of the Herbarium at the University of Waterloo. His long career has encompassed research into many of the most difficult plant taxa such as Caryophyllaceae, Lamiaceae, Euphorbiaceae, Asteraceae and the *Solidago canadensis* complex. Dr. Morton has spent a lifetime documenting flora species in Ontario. He recognized the importance of rare plants to Ontario's legacy early, with particular attention to Manitoulin Island and the islands near Tobermory. He authored an early *Canadian Encyclopedia* entry on endangered plant species. He was also instrumental in managing the environmental reserve on the University of Waterloo's North Campus near Columbia Lake to protect it for its environmental values, maintaining a garden of native (as well as non-native) species of Lamiaceae.

He did not settle in Ontario immediately. Instead, after leaving England in 1952 for Ghana, he pursued early botanical experiences in Africa with a particular interest in tropical African montane floras. He still has an active interest in the botany of Africa: with recent contributions to papers describing African Euphorbiaciae in the Congo, as well as Caryophyllaceae in China. His most recent contributions also include treatments for Caryophyllaceae in the *Flora of North America.*

Dr. Morton began investigating the flora of Manitoulin Island in 1972, publishing a preliminary checklist in 1977 before producing an illustrated list in 1984. His *Flora of Manitoulin Island* (with Joan Venn) is a *tour de force*, describing the geology, glacial and post-glacial history, and vegetation of Manitoulin Island, as well as providing a comprehensive list of species with annotations describing their distribution and status. He provided some of the earliest descriptions of phytogeography on Manitoulin Island, showing how the diversity of flora is influenced by both habitat and plant migration routes. He enthusiastically embraced the use of computer databases in collating herbarium information, using these to catalogue information on flora of Manitoulin and later, Ontario.

Dr. Morton has contributed to several studies on the status and conservation of rare plants in Ontario, suggesting the importance of fire in maintaining habitat for Hill's Thistle (*Cirsium hillii*) and providing information for the status report for American Columbo (*Frasera caroliniensis*) and Houghton's Goldenrod (*Solidago houghtonii*). He has also contributed to information on the spread of non-native plants in Ontario, with a particular interest in the spread of Giant Hogweed (*Heracleum mantegazzianum*).

Like many botanists, he has developed a broad interest in natural history that encompasses organisms far outside the botanical sphere. He has investigated butterflies and moths of Great Lakes Coastal Dunes. In 2005 Dr. Morton rediscovered the Aweme Borer Moth (*Papaipema aweme*) which, until his discovery, had not been identified worldwide for 70 years and known from only 5 locations globally. The day Dr. Morton announced his discovery was the same day that the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) met to assess its status. Within hours of confirmation the record was all over the world by email.

John Morton and Joan Venn published "*A Checklist of the Flora of Ontario: Vascular Plants*" in 1990. This publication was the first checklist of the flora of Ontario, and still provides baseline data for documenting new introductions of non-native species to the province.

When I went to present Dr. Morton with the Goldie Award at his house, he was cataloguing his specimens from a trip to Mount Kilimanjaro in the 1950s, despite a chronic and debilitating respiratory illness. He said he was glad to have the time, finally, to revisit some of his old work and complete some of the tasks he felt he had neglected, illustrating that botany is not just a profession, it is a way of life.

Sarah Mainguy

Joan Venn (left) and Dr. John Morton (right) in the University of Waterloo Herbarium. Credit: C. Hendrickson

"I couldn't have done any of this without Joan"

Joan Venn, a senior laboratory technician in the Zoology Department at the University of Liverpool, jumped at the chance to join world renowned freshwater biologist Dr. Noel Hynes when he left to take up his position as the first chair of Biology at the University of Waterloo (UW) in 1964. Joan was not the botanist we know today, co-author with John Morton of the *Flora of Manitoulin Island* and *A Checklist of the Flora of Ontario: Vascular Plants,* .but a zoology lab technician. At UW in1970 she became a botany technician, looking after the UW Herbarium (WAT), under the guidance of Goldie Award recipient Dr. John Morton.

Joan's support of Dr. Morton's work took her not only to Manitoulin and its surrounding islands, but to Australia, New Zealand, West Africa, Zimbabwe and South Africa. In her travels with Dr. Morton, they have botanized every Canadian province and contiguous American state. In the herbarium, Joan's responsibilities included preparing collection labels,

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UNIVERSITY OF
Waterloo

14 August 2009 e-mail:jkmorton@sciborg.uwaterloo.ca

Sara Mainguy
North-South Environmental
35 Crawford Cres.
CAMPBELLVILLE, ON.
L0P 1B0

Dear Sara,

I was surprised and delighted to learn that I was to be honoured by the FBO with the Goldie Award.

Goldie has a particular significance for me because my first research project at the University of Waterloo, when I arrived in Canada in 1968 was a study of Goldie's Chickweed - *Stellaria longipes* - a species which Goldie discovered and named from a collection that he made on June 14, 1819 on his journey through Upper Canada "in the woods near Lake Ontario".

In 1968 I tried to retrace Goldie's journey and I rediscovered the *Stellaria*, still growing vigourously in the area where Goldie found it nearly 150 years earlier. It was growing on an alvar near Odessa in the Kingston area.

In 1968 I also took on my first graduate student at the University of Waterloo - C.C. Chinnappa (CC to all of us in the Department of Biology). He studied *Stellaria longipes* with me for many years, receiving a Ph.D. for his work. Subsequently he became Professor of Biology at the University of Calgary where he has had a distinguished career. As part of our work on Goldie's Chickweed, CC and I, along with Joan Venn (who still looks after our herbarium at the University of Waterloo) travelled extensively in North America collecting living material of this species where ever it grows, in order to study its remarkable biology. We grew this material in the Botanical Garden and greenhouse at the University where at one time we had several hundred collections in cultivation.

I also attempted to rediscover the original specimens of the *Stellaria* which Goldie had collected. He donated his herbarium, with the *Stellaria* specimen in it, to Glasgow University in Scotland. Some years later that herbarium was transferred to the one at the Royal Botanical Gardens in Edinburgh. However, repeated searches in that herbarium by many botanists, myself included, have failed to find Goldie's specimen of *Stellaria longipes* and it was thought to have been lost.

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In 1994 on a visit to the herbarium at the Royal Botanical Gardens in Kew, I was going through their extensive collections of *Stellaria* and came across a portion of Goldie's collection of *Stellaria longipes* mounted on a sheet along with specimens of the similar *Stellaria longifolia*. The specimen had been sent to Sir Joseph Hooker who became Director at Kew. It was clearly labelled by him "flowering in June, Woods of Lake Ontario, Goldie". So we now had the original material (the TYPE collection) of Goldie's Chickweed.

Also about that time I was able to locate one of Goldie's descendants living in Ontario - Mrs. Theresa Goldie Faulkner - a great great grand-daughter of Goldie. She sent me a booklet that she had written about her illustrious ancestor. This is part of my extensive botanical memorabilia of John Goldie with whom I am honoured to be associated by this award. I am saddened that poor health prevents me from being with you to receive this award. Many thanks for the recognition that you have bestowed upon me. I hope that you and your members have a successful meeting in Orillia and wish you every success in the future.

Yours sincerely,

J.K. Morton
Professor Emeritus

...cont'd from p. 5

mounting specimens for both Dr. Morton and Dr. John Semple, as well as those submitted by students and exchange programmes with other herbaria, and incorporating them into the herbarium collection.

Both Joan and Dr. Morton enjoyed the companionship and field support of his late wife, Doreen, during all their fieldwork. Their field season extended from spring until fall, island-hopping in a broad-bottomed, keeled boat of New Zealand design built by Dr. Morton and his son David. The small craft concealed a remarkable capacity for its three passengers, camping gear, food, and botanical specimens, a capacity that left a group of campers on one island in open-mouthed disbelief as they disgorged the boat's contents.

A typical day would start after breakfast, when as many locations on Manitoulin Island or the surrounding islands were surveyed as possible. On some small islands they just dropped anchor and examined the flora, while they camped on the larger ones such as Great Duck and Club Island. Joan would record the latin names of the plants that Dr. Morton identified, some of which were bagged and tagged for examination at the end of the day. Evenings saw them eating dinner, examining specimens, pressing select individuals for vouchers, and ensuring that the ones already pressed were not getting mouldy. At times to assist proper drying blotters were dried out over the campfire.

Even though Joan retired from her post at the University of Waterloo Herbarium in 1996, she can still be found there most weekday mornings continuing her duties as a volunteer.

Joan is also co-author of *Flora of the Tobermory Islands*, and a paper in *The Michigan Botanist* on "The Flora of Caribou Island, Lake Superior".

Cheryl Hendrickson

Nominations for the 2010 Goldie Award can be sent to:Bill Crowley fisheye @eagle.ca before July 1, 2010.

Understanding and Defining Invasive Species

by Bill McIlveen

The term "invasive species" is becoming well-known to the public as well to the scientific and naturalist communities. It is used rather casually by the popular press. Its meaning is not entirely consistent from one person to the next. Generally, the concept is of the population of one species growing rapidly and overriding or dominating an area formerly used by other native species. Certain portions of the public do understand that human health might be a factor, especially when that potential effect is highlighted in news media reports such as those related to the skin irritating qualities of Giant Hogweed (*Heracleum mantegazzianum*).

Defining Invasive Species

Defining what an invasive species is can cause intense debate. We can turn to the dictionary to find definitions of each of the component words in the term "invasive species". Even defining the word 'species' can turn into a heated debate among members of the scientific community. If we avoid the finer details of the definition of 'species' and accept the word in its general usage, we can proceed.

In the most-simple case, a species that is able to sustain itself in a new environment where it never existed before might be considered to be invasive. Most of the concern about invasive species though is really directed towards a small portion of species that are highly aggressive in nature. The word "invade" and its derivatives have several connotations but the most relevant definition is "to enter and spread with harmful effects". As long as we accept that the term "harmful" is based on human perspective and values, we can proceed with the definitions. Including the word "alien" to the term does not resolve too much in clarifying (alien = not belonging to the same country) for certain native species have aggressive qualities that some people consider objectionable. The eye of the beholder plays a strong role in determining whether a species should be judged as harmful or objectionable in some manner. Some people consider the native Riverbank Grape (*Vitis riparia*) as invasive for example, because it grows over and obscures the existing vegetation. Some native species like Common Milkweed (*Asclepias syriaca*), most dodders (*Cuscuta* spp.), and Poison Ivy (*Rhus radicans ssp. rydbergii and Rhus radicans ssp. negundo*) are listed as noxious weeds in Ontario and some people equate "noxious" with "invasive". Dealing with Common Reed (*Phragmites australis*) is particularly perplexing because the native form is rare yet the aggressive, non-native form of the same species is causing it to rank as one of the greatest problem plant species in the province.

In the United States, the Invasive Species Advisory Committee (ISAC, 2006) has reviewed the meaning of "invasive species" quite well through a white paper covering more than just vegetation. It states that under **Executive Order (EO) 13112, an** invasive species is defined as a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm, or harm to human health. Invasive species can be plants, animals, or pathogens. The paper correctly notes that that any definition of invasive has implications for certain sectors of human society in the US as these could impact upon property use, pet ownership, agriculture, horticulture, and aquaculture enterprises. With respect to plants, they have interpreted the meaning to apply only to plants that are non-native. They have not considered some native species, whose characteristics might be interpreted by some people as very aggressive and unwanted, as invasive. It is understandable why the Committee might have interpreted the meaning of invasive to apply to only non-native species although good arguments can be made to include some native species with their invasive brethren. By the same token, there are many non-native species whose presence is relatively benign.

Using weeds as an example, the Committee presented certain criteria that need to be met in order for a plant to be considered invasive. First, the species needed to overcome a geographical barrier such as a mountain range or an ocean to reach the place where it can be considered as an alien. Most often, humans have been implicated in transporting the plant from its former location to its present one, whether deliberately or unintentionally. Secondly, the species must survive in its new location. It would seem rather intuitive that a plant that cannot survive in its new location will not become an invasive. From that, the plant must form a self-sustaining population that does not require further introductions from its point of origin for the species to be maintained. The self-sustaining population must be able to disperse and spread and to do this relatively rapidly. Rapid spread alone does not qualify a plant as invasive. To be classed as an invasive, it must also cause negative environmental, economic, or human health effects that outweigh any beneficial effects.

For our purposes, we can leave out the issue of native *vs*. non-native species for the present. It is true that the majority of problem or unwanted species are not native. The distinction between native and non-native species is typically taken to be species that were present in the area, e.g. Ontario, before the arrival of Europeans ca 1500 AD. Europeans did arrive in North America (*i.e*. the Norse at L'Anse aux Meadows in Newfoundland) some 500 years earlier. I have not been able to locate information that shows whether they brought any species with them that persisted, therefore for the present we can accept that species present here in 1500 AD are indeed native species.

If we accept the definition of an invasive species to be a species whose introduction causes or is likely to cause economic or environmental harm, or harm to human health, then we have to include almost all agricultural weeds. This is because their control at the very least is going to involve some form of cost. In the larger scale,

many such weeds are relatively minor concerns and simply represent a normal cost of doing business. The main plant species of concern are those that fit the above definition but also have a capacity for rapid spread and dominance in a ecosystem, whether that ecosystem is a natural one of one of human construct. It is the aggressive side of such species that attracts our attention and this needs to be part of the definition.

Human Involvement

In nearly all cases where alien invasive species are an issue, it is human activity that has played a significant role. This could be simply the transport of the species from a point of origin on another continent, either intentionally or inadvertently, to a new location. Human mismanagement of a situation could allow a species to escape from cultivation through a variety of routes from accidental escape of seeds or other propagules, to improper disposal of plant wastes, to simply abandoning a site that had been used for agriculture or homesteading. As well, the way that humans alter a landscape – e.g. through agricultural practices, forest management, or expanding transportation routes – all could set up situations where a species that once was not a problem starts to spread unchecked and thus become a cause for concern. With human intervention, native species can spread aggressively in disturbed habitats.

We humans mostly do not consider that we are an invasive species all on our own. We have spread from a point of origin in Africa to live on much of the habitable portions of the earth. Effectively, we have completed a species invasion of the majority of the planet. Such an assessment does not mean that we have no right to occupy the lands we do, but unless we can see ourselves as an invading species, we have little hope in understanding what we have done or are doing to the planet. As a species that evolved on planet earth, we have a right to continue our existence; however, we do have a responsibility for ensuring that all other species have an opportunity to exist as well. Our overall superior intelligence to other creatures has permitted us to spread our numbers widely yet that intelligence did not prevent us from destroying and wasting many of the resources available to us. Neither did it prevent us from what effectively amounts to fouling our own nest as well as the nests of many other species. The race is on to determine whether the human species can turn its collective intelligence into wisdom that will avoid the destruction of its own kind.

As humans turned to cultivation of plants to support themselves, they have come to rely on relatively few plant species capable of producing adequate quantities of food. There are a larger number of secondary crops that are used as well to supplement the major few. Overall, the number of plant species utilized directly by humans is only a small fraction of all the plant species that exist on the planet. A main consideration here is that in order to have enough of the selected crops grown to sustain the human population, a huge area of the natural environment was converted from its former natural state into agricultural land. In Ontario, statistics for 2004 showed that over 8,000,000 acres have been converted from formerly forested land to agricultural land to allow cultivation of the main agricultural species. This does not take into account the lands cleared or disturbed for other crops, urban development, or transportation. Also, it does not include changes brought about by cutting associated with normal forest cutting. Even allowing for the fact that some agricultural lands have recently become forested through intentional planting or benign neglect, the fact remains that human activities have caused major disturbances in the natural plant communities in Southern Ontario.

Fortunately, despite the huge acreages devoted to these crops, the species grown do not usually persist outside of theagricultural land devoted to this purpose. Certainly, a few plants such a corn may linger for a year or two as volunteer plants in the subsequent crop. Some species such as Timothy (*Phleum pretense*), Orchard Grass (*Dactylis glomerata*), Red Clover (*Trifolium pratense*) and Alfalfa (*Medicago sativa*) grown for hay may spread from the present crop areas but these have already been established in wide areas of the natural environment for many years without being aggressively invasive. Bird's-foot Trefoil (*Lotus corniculatus*) is sometimes used as a fodder crop and for reclamation purposes and has shown a slightly-more-aggressive tendency to spread than the other hay species. One noticeable feature of the crops that don't remain in the natural environment for any extended period is that they are annual while those that persist are perennial.

Species Population Growth Patterns

It is a necessity for all living species that they have a means to reproduce themselves. If they cannot, on average, at least produce enough offspring to reproduce and thus replace themselves, then the species is doomed to decline and ultimately oblivion. Species have therefore evolved with many different strategies to reproduce themselves in numbers that exceed a one-for-one replacement regime. This is necessary to overcome the multitude of factors that might reduce their numbers. Consider for example, that an average plant over its lifetime will produce many seeds but many seeds never reach a suitable place for the plant to grow, if the plants do grow, they never mature due to attacks by disease or pest, or the plants are damaged by frost. Such factors reduce the success rate for the species and generally keep the plant numbers at constant levels over greater time scales.

If we imagine a plant that becomes established in a new but very suitable area, that plant will produce several times its own number. If we take a simple example where that plant produces 10 viable seeds, under favorable circumstances it will have 10 offspring in the next growing cycle, perhaps within a year or less, perhaps not for many years as in the case of many trees. At the end of that second cycle, each of those offspring will produce 10 of their own giving a total population of 100 where there was one original plant. This same process would result in 1000 plant for the next cycle, 10,000 in the next and so on. This is exactly the same as simple interest at work if that parent plant dies at the end of its first cycle. If it survives along with its offspring, then it becomes compound interest. Readers may best understand the way this works if they observe how much they owe on their credit cards if they fail to make payments in an orderly fashion.

Most plants will produce far more than the 10-seed example. Often, they can produce hundreds or even thousands of seeds. Such reproduction and expansion of the population over time is considered to be logarithmic. A plant that produces a thousand seeds but over the next cycle effectively loses 99% of those seeds for what ever reason (failure to germinate, eaten by pests, etc.), is still able to produce 10 viable offspring and so the population of the species will continue to increase. The effective rate of increase, assuming this to be relatively constant, is referred to as '*r*' (rate) when one starts to apply mathematical models. Figure 1 illustrates how a population of anything (plants, animals, insects, etc.) grows at three different example rates. The higher rate of '*r*', the steeper the growth curve.

The spread of plants in this manner, like that of any other type of organism, cannot be sustained indefinitely. At some point, a maximum population will be attained for there is a finite amount of habitat and resources that are suitable for supporting the growth of the plant. The same principal applies to cattle in a pasture, insects attacking a crop, or pathogens attacking plant leaves. The maximum area or number of plants will be achieved when 100 percent of the suitable habitat is exploited. It is reasonable to expect that the suitability of the habitat or niche for the plants will be less and less hospitable as the edges of the niche are reached on a broad scale. But if we imagine as an example, the spread of Dandelions (*Taraxacum officinale*), without competing plant species, over a uniform cultivated field as the available niche, we can grasp the concept of maximum area quite easily. Dandelion seed can spread over the whole field and ultimately the whole field will become covered by the plants. As the population increases, there will be fewer and fewer spaces left for any new plants to develop. The graph of the spread of plants into suitable habitat will follow a curve like that illustrated in Figure 2.

Epidemiology

The two graphs illustrate two very simple aspects of the spread of species population using mathematical modeling. There are many more things that can be brought into the modeling to refine this but readers will recognize that the rapid increase population shown in Figure 1 is very much part of the early period illustrated in Figure 2. Refinement of the mathematical models includes assessing the factors that control the '*r*' rate. This could include the number of seeds produced per plant, the presence, incidence, and impact of disease and insect attacks, the number of years for a plant to reach reproductive maturity, the frequency of 'crop' or 'seed' years, and environmental factors including habitat suitability. It is possible that models can incorporate measures to control potential spread of plants through sanitation measures and other means that control the numbers of plants in a population. There are few cases indeed where a niche can be exploited by only one species. Often several to many species can grow in the same habitat and compete with each other for space, and resources such as light and nutrients. In such cases, this is competition between species. In other cases, the plants form a community in the same space but work together for their mutual benefit. On the one side, the plant is attempting to increase its population. On the other, a number of factors are conspiring to check rampant increases. The net balance determines how fast the population will increase or decrease. The combined effects of the aforementioned factors determines the effective 'r' rate for the population growth in any plant species.

Measures taken by humans to control a particular species include sanitation (preventing the first introduction), eradication, or applying assorted measures to keep the overall rate of spread to acceptable levels. Any control measures applied are really attempts to keep the 'r' rate as low as possible and thus avoid the most steeply ascending part of the population growth curve shown in Figure 1.

There are some other factors that need to be considered for the rate of spread in one place may be different from the rate of spread over the entire geographic area. If we take the dandelion population growth example a step further, we can imagine that that field is an isolated population where the rate of spread is quite fast. However, the rate of spread will be much slower if the next suitable habitat (e.g. another cultivated field) is located several concessions distant. Extra time will be required for the seed to make the leap from the founding site to the new site. The chances of a seed reaching a suitable site will be dependent on the distance of the seed source from the new habitat, the wind direction, and the distances involved, not to mention the seed load that is produced. In the case of dandelion, the seeds are wind dispersed and thus can travel relatively easily over a rather long distance. The probability is that most seeds tend to end up in close proximity to the parent rather than at great distances. Only a small proportion will travel long distances so the matter of probability becomes a greater factor on the ultimate dispersal and establishment success of individual seeds. Larger seeds such as nuts will not usually travel for as great a distance as the wind-borne seed. Intermediate-sized seed can be expected disperse over intermediate distances. Seed size has another role in that larger seed have larger resources to ensure the survival of the seedling. In addition, specialized modes of dispersal such as water or via animal vectors (i.e. burs, seeds transported by birds) constitute variations in evolved adaptations among different species. Plant size itself has a minor role where taller plants have a great ability to disperse seed over further distances than short plants.

It is critical to plants that their seeds land in a suitable place to grow and prosper. If the seeds germinate in a less-than-desirable location, they have no option but to make the best of that situation for they have no choice to move to a new and better location.

Generally, plants that are looked on as invasive have high '*r*' rates and thus spread quickly and conspicuously on the

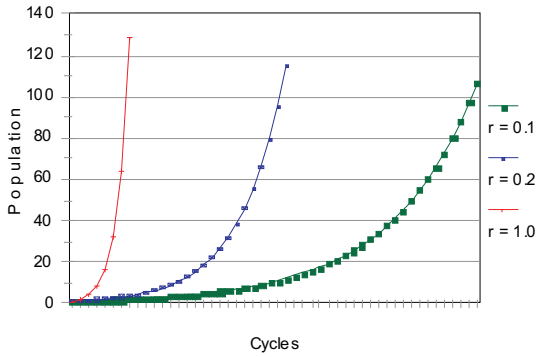

Figure 1. Examples of population growth curves for species reproducing at different rates.

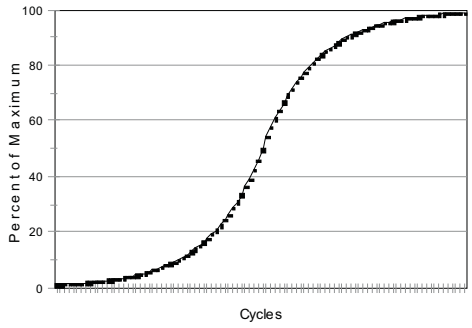

Figure 2. Graph showing the "s-shaped" pattern of colonization of a suitable habitat by an introduced organism.

landscape. In part, invasive species have a high '*r*' rate because the habitat lacks the pests and diseases or other factors that might otherwise keep the population growth rates in check. A high '*r*' rate has more impact on the human state of awareness than a slow one because they can see the rapid changes in the plant population. Ultimately though, the maximum plant population will be the same. Only the time to reach a maximum population will differ.

The importance of an invasive species is not so much the rate of growth but what it does in the environment and its socio-economic impact. In the former, invasive plants compete with and ultimately displace native species, at least under the specific circumstances of any given situation, and affect the habitats or health of wildlife. In the latter, the invasive species can affect agricultural production, human health and affect the economy through reducing available pasture land, forest health, human health, and impose extra costs in controlling unwanted plants during crop production and so would be considered invasive by the US definition.

No comprehensive or unified list of invasive plants has been developed for the Province of Ontario as a whole. Instead, several short lists have been developed by different groups or agencies. As might reasonably be expected, such lists are locally-biased depending upon the species present in any specific group's own sphere of interest. Some species do frequently appear on more than one list. It is hoped though that a comprehensive and standard list of invasive species can be developed that cover the entire Province indicating the nature of the threat for each species. This list should include species that are currently present as well as those that pose imminent threats though not actually present in the Province as yet. In that way, the discovery of a new pest can be assessed quickly and resources deployed to eradicate it once a new point of establishment point is known. It is usually far easier to eliminate a new small colony and prevent its spread than to face a well-established population of plants that we don't want.

We must also make note of the possibility that species populations will change as part of natural succession. Over time, one species gives way to another until some sort of climax community has become established. In some cases, this change is very rapid but, in others, the displacement occurs very slowly. Natural forces such as fire, severe storms, erosion or flooding will dramatically alter a habitat. Native species can rapidly colonize that new disturbed site and behave very much like an invasive species. Burned areas are often rapidly colonized by Fireweed (*Epilobium angustifolium*), Aspens (*Populus tremuloides*), or birch (*Betula* spp.) or in others by serotinous species. As another example, native hawthorns (*Crataegu*s spp.) or Easter Red Cedar (*Juniperus virginiana*) can quickly overwhelm an abandoned pasture. The natural succession process is usually considered to be a desirable thing. If we are anxious to reestablish a forest in a burned area, then the process may seem too slow (the early-colonizing, native species may require control to speed up the process). The occupation of former pastures by the species mentioned may likewise be deemed undesirable.

Given the right opportunity, plants like other organisms, will continue to reproduce until a particular niche is filled. Sometimes that niche is created by various human activities. Sometimes it is simply through human intervention that a plant gets introduced to a new geographic area. A plant in a new environment will simply do what it is genetically programmed to do. If the combined conditions of environment and genetics allow the plant to grow and spread an aggressive manner, then movement toward a new ecological or economic balance is set in motion. In that process, human desires, perceptions, and values come into play. When humans are dissatisfied with the change in numbers of a particular (unwanted) plant species, then it is deemed to be an invasive plant. But in other circumstances, a new species may be actively grown and spread through cultivation. That situation (i.e. crops) would be viewed quite differently and considered to be a desirable thing. In the end, it is simply human values that determine whether a plant should or should not considered invasive. And while there may be general agreement on many points of such an assessment, there is no guarantee that every person will see a particular situation in exactly the same way.

W.D. McIlveen

Reference

Invasive Species Advisory Committee 2006. *Invasive Species Definition Clarification and Guidance White Paper*. Submitted by the Definitions Subcommittee of the Invasive Species Advisory Committee (ISAC)

Hello:
As a member of FBO I am interested in whether or not others have noticed a tall, showy plant with pinkish two-lipped flowers that I believe is known as Pink Touch-me-not also known as Himalayan Balsam (*Impatiens glandulifera)*. I have seen it grow and spread rapidly along cottage roads around our property in Haliburton. Is it spreading in other areas of the province? Is it possible that this could become an invasive species?

Aileen Coates

Himalyan Balsam is a locally well-established invasive exotic in southern Ontario –Mike Oldham,

Editor's Corner

In the small amount of space that remains in this issue, I would like to thank all of the board members who made my job as Editor so easy in the many ways they encouraged the writing and submitting of field trip reports and other articles. Bill Draper and Bill Crowley were always vocal in their appreciation for my work, and my thanks goes to them in return. It has been an honour and a privilege having Mike Oldham and Al Harris oversee the accuracy of and comment on each issue. Thanks especially to Sarah Mainguy for her support and wide open mind, and to Bill McIlveen for his sardonic good humour and excellent ideas, not least of which is the Goldie Award. Newsletter stuffing, stamping and sticking were generously provided by my husband.

As Editor, I have been able to combine my love of design on the page with my love of plants. It has given me a reason to write down some of my philosophical thoughts about the relationship between us and plants, which in turn saw "Botanizing on the Right Side of the Brain" (vol. 19.3/4) republished in *Bios* and *The Iris.* Finally, during my term I have seen three of the botanists that I most admire recognized with the Goldie Award. My work here is done.

Cheryl Hendrickson, Editor

The Plants We Love to Hate

One of the traits I enjoy about Larry Lamb, my early mentor and now friend and colleague, is his outrageous passion for plants. Like the thousands of other students that went through the Ecology Lab at the University of Waterloo, we learned from Larry to prize and adore Ontario's native plants. We also learned to revile its alien and invasive species.

When I left to do my Master's degree at Memorial University of Newfoundland, there was a small inner sigh of relief to be able to work with plants on the landscape from a different context than the one I had learned in Ontario. One small fact troubled me about this invasive plant thing: weren't I, and Larry, and most of the students, faculty and staff at the university, and most of the human population of Ontario, in fact, non-native? One could even say invasive. And if we are to revile all biota in Ontario that is non-native, how is it logical and consistent to overlook our presence here or to value it differently?

It was my great good fortune to have as my thesis topic the invasion of Coltsfoot (*Tussilago farfara*) in Gros Morne National Park on the west coast of Newfoundland. Before I even got there, I was assigned reading that demonstrated that the flora of the harbours that brought ships back and forth between England and St. John's consisted of the same mix of species native to England and native to Newfoundland. Propagules were loaded and unloaded with ships' ballast. Then there was the plant native Americans called "white man's foot" – *Plantago major*, or Broadleaved Plantain, because the flat, foot shaped leaves of the rosettes resembled foot prints, and this new plant could be found on paths wherever the newcomers trod.

As I delved into the literature more, I discovered points of view that talked about disturbance as one of the elements of invasion, and that disturbance could not only be local and obvious, say the cutting of forests and tilling of soil, but distant and subtle, such as the mercury and pcbs we now find in the Arctic, a product of distant southern industry. The idea of disturbance as one of the drivers of botanical invasion (along with availability of propagules and suitable plant-available resources) challenged the increasingly poplar notion that plants such as Purple Loosestrife (*Lythrum salicaria*) were just intrinsically *bad plants.* As campaigns mounted to mobilize volunteers to rip European Buckthorn (*Rhamnus cathartica*) and Garlic Mustard (*Alliaria petiolata*) from woodlots, this notion of invasives as gangsters bullying and outcompeting our native species was popularized and they became the plants we love to hate. It gave us licence to do to them what we would never do to other plants, and to feel good about it.

A dark tangle of Buckthorn and robust understory of Garlic Mustard characterized a study site near the University of Waterloo that I nicknamed "Woodlot from the Planet Zog". It turned out, after my exhaustive airphoto research, to have been created when Laurel Creek was moved and channelized. Channelization profoundly affected the hydrology and thus the vegetation of this small riparian remnant. And before the end of my field season in Gros Morne National Park I discovered that, as I first revealed at a Park potluck supper, "it's coming from the gravel pits". The practice of stockpiling gravel for road building so that there was a seven year supply allowed the small amount of Coltsfoot that existed in the park previous to its infrastructure building period to colonize the stockpiles. There they formed extensive networks of rhizomes that were eventually excavated and sown along the roads in a favourable high pH substrate. This conspicuous invader was on every kilometre of road in the park.

I also discovered the human dimension of attitudes around invasive species control. What were the underlying values that people have about, say, Purple Loosestrife and its control? I found that the discipline of Biology thinks of *Homo sapiens* as outside of nature. It follows that any of our actions that lead to the movement or establishment of exotic species means that they, too, are unnatural. Another premise and conclusion that did not sit well with me. Happily, though, my discipline of Geography doesn't see humans the same way. We are a part of nature, and as geographer George Marsh said, "an exceptionally powerful biotic factor (Williams 1993)".

So, given my own research and experience, not to mention the many capable researchers who have arrived at similar conclusions, I become a little cranky when I hear sabres rattled and battle cries sounded against some of the plants that have stabilized slopes and streambanks, colonized contaminated sites, and provided habitat where our doings have made it difficult for native species to do so.

Like all botanists, I am deeply appreciative of vegetation communities that remain largely unimpacted by invasive species. And my shoulders sink a little when I breach a woodlot edge to find the ground strewn with undecayed wood overgrown with fungicidal garlic mustard in its various stages of development. I understand the management imperative that elects to control invasive species in sensitive habitats. But what I ask you all to appreciate is that these species did not arrive here on their own. We brought them, and our activities, whether through the importation of earthworms, the increased ambient temperature created by urban heat islands, or any of a multitude of other settlement effects, are the reason for their existence. We are the invaders. It is the nature of our species to spread and colonize as we did when we left Africa 60,000 years ago. We are a part of nature, as are the plants we bring. Like us, they are here to stay.

Cheryl Hendrickson, Editor

References

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Asters and Goldenrods of Ojibway Prairie Nature Reserve September 19, 2009

Tony getting down and dirty with Smooth Aster (*Symphyotrichum laeve*).

I try to never pass up an FBO hike guided by Tony Reznicek, just one of the great botanists of North America produced by Southern Ontario. I still remember him at Wye Marsh on the last one I attended. He showed up on a cold spring day wearing a flannel shirt, jeans, and an old pair of Adidas with a shopping bag tied around his wrist that carried his lunch. Needless to say, he stood in sharp contrast to the eager botanists that surrounded him decked out in rubber boots, Gortex jackets, turtlenecks, fancy bags and fanny packs, me included. An hour later he was plucking strange sedges off a hummock in the heart of marsh calling them old friends while wearing wet feet and a big grin. It was very entertaining!

This hike occurred on a warm, late summer day and featured the asters and goldenrods of Ojibway Prairie Nature Reserve in Windsor. Everyone knows asters and goldenrods can be a difficult group and not wanting to the confuse subject more (and admittedly, because of a little laziness), I thought I would photo document the hike instead, again, in the interests of entertainment.

Below is some of the opening text in the handout that Tony gave us that briefly summarizes the latest understanding on asters and goldenrods in Ontario. Enjoy!

Paul O'Hara

Asters and Goldenrods

What makes an aster or goldenrod? Several characters in combination; alternate leaves, both ray and disk flowers present (except in a very few species), a pappus (vestigial calyx) of numerous long, soft hairs, overlapping but usually unequal phyllaries (involucral bracts), and relatively small heads. Goldenrods and asters are relatively closely related. The most similar genus to our Ontario Asters is Erigeron, *the fleabanes. Fleabanes are spring blooming (though* E. annuus *will continue through the summer and fall), have involucral bracts (phyllaries) more or less equal in length and overlapping, and often have more and narrower rays.*

Asters have rays that are numerous and white, blue, pink,

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Botanists Wanted for Plant Surveys

St. Lawrence Islands National Park welcomes botanists to a "working holiday" in May. Join us to survey herbaceous and woody plants in open and fenced plots on Hill Island. About 80% of 4 km sq Hill Island is undeveloped and diverse and harbours several animal and plant species at risk. Forest communities are varied, typified by low wet areas between well-forested ridges. Low wet areas support Acer spp, Juniperus virginiana, Populus spp.

and Ulmus americana as well as a wide abundance of herbaceous plants. High dry areas support Fagus grandifolia, Pinus strobus, Tsuga canadensis and Quercus alba. The backbone of the Island supports one of the largest stands of Pinus rigida (Pitch Pine) in Canada. For decades, hyperabundant deer have overbrowsed this beautiful, diverse landscape but deer management is allowing plants to recover.

Be a part of this recovery by helping survey some of the 40 open and fenced plots distributed on the island. Surveys will take place May 24-28.

If you are able to contribute 1 full day or more, we will take a boat tour of the Thousand Islands to visit sites with rare plants.

Please indicate your interest before May 7, 2010 to: Mary Beth Lynch, Ecosystem Scientist (marybeth.lynch@pc.gc.ca

Lunchtime specimen analysis. On the left, New England Aster (*Symphyotrichum novae-angliae*). On the right, Heath Aster (*Symphyotrichum ericoides*). In the middle, their hybrid, Amethyst Aster (*Symphyotrichum* x *amethystinum*).

The two *Euthamias* growing together. Tony's hand is on the more delicate *Euthamia gymnospermoides*. The more common *Euthamia graminifolia* is in the foreground.

Stiff Goldenrod (*Solidago rigida*).

Comparing the pubescent, greener stems of *Solidago altissima* to the glabrous, reddish stems of *Solidago gigantea*.

Riddell's Goldenrod (*Solidago riddellii*).

Photo credit: Paul O'hara

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purple, or some combinations of these colours and, on average, heads larger than about 8mm across.

Goldenrods have fewer (often less that 10) rays that are yellow (white in two species rare in southern Ontario) and small heads mostly less than about 8mm across.

Goldenrods include two genera, the true goldenrods: Solidago, *and the grass-leaved goldenrods:* Euthamia. Euthamia *(two species in Ontario) have narrowly linear, entire leaves with tiny, shiny resinous dots, and heads stalkless in clusters of two or more. The true goldenrods have wider, often toothed leaves that do not have resinous dots, and usually stalked heads borne singly.*

Asters are now split into several genera based on evolutionary relationships as elucidated by DNA analysis, and also technical features of the flowers. In southern Ontario, there are about as many asters as goldenrods – about 24 asters and 23 goldenrods. There is only one true Aster *native to Ontario –* A. alpinus*, a rare plant of the Hudson's Bay shore.*

Tony Reznicek