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Taxonomic Paper

Biodiversity inventories in high gear: DNA barcoding facilitates a rapid biotic survey of a temperate nature reserve

Angela C Telfer‡, Monica R Young‡, Jenna Quinn§, Kate Perez‡, Crystal N Sobel‡, Jayme E Sones‡, Valerie Levesque-Beaudin‡, Rachael Derbyshire‡, Jose Fernandez-Triana|, Rodolphe Rougerie¶, Abinah Thevanayagam‡, Adrian Boskovic‡, Alex V Borisenko‡, Alex Cadel#, Allison Brown‡, Anais Pages¤, Anibal H Castillo‡, Annegret Nicolai«, Barb Mockford Glenn Mockford», Belén Bukowski˄, Bill Wilson», Brock Trojahn§, Carole Ann Lacroix˅, Chris Brimblecombe¦, Christoper Hayˀ, Christmas Ho‡, Claudia Steinke‡, Connor P Warne‡, Cristina Garrido Cortesˁ, Daniel Engelking‡, Danielle Wright‡, Dario A Lijtmaer˄, David Gascoigne», David Hernandez Martich¢, Derek Morningstarℓ, Dirk Neumann৯, Dirk Steinke‡, Donna DeBruin Marco DeBruin», Dylan Dobiasˁ, Elizabeth Sears‡, Ellen Richardˁ, Emily Damstra», Evgeny V Zakharov‡, Frederic Labergeˁ, Gemma E Collins¦, Gergin A Blagoev‡, Gerrie Grainge», Graham Ansell‡, Greg Meredith℗, Ian Hogg¦, Jaclyn McKeown‡, Janet Topan‡, Jason Bracey», Jerry Guenther», Jesse Sills-Gilligan‡, Joseph Addesi‡, Joshua Persi‡, Kara K S Layton₳, Kareina D'Souza‡, Kencho Dorji₴, Kevin Grundy», Kirsti Nghidinwa₣, Kylee Ronnenberg‡, Kyung Min Lee₹, Linxi Xie₦, Liuqiong Lu‡, Lyubomir Penev₭, Mailyn Gonzalez₲, Margaret E Rosatiˀ, Mari Kekkonen‡, Maria Kuzmina‡, Marianne Iskandar‡, Marko Mutanen₹, Maryam Fatahi‡, Mikko Pentinsaari₹, Miriam Bauman», Nadya Nikolova‡, Natalia V Ivanova‡, Nathaniel Jones‡, Nimalka Weerasuriya₦, Norman Monkhouse‡, Pablo D Lavinia˄, Paul Jannetta‡, Priscila E Hanisch˄, R. Troy McMullin˅, Rafael Ojeda Flores₩, Raphaëlle Mouttet₸, Reid Vender‡, Renee N Labbee‡, Robert Forsyth‡‡, Rob Lauder§§, Ross Dickson», Ruth Kroft», Scott E Millerˀ, Shannon MacDonald‡, Sishir Panthi||, Stephanie Pedersen‡, Stephanie Sobek-Swant§, Suresh Naik‡, Tatsiana Lipinskaya¶¶, Thanushi Eagalle‡, Thibaud Decaëns##, Thibault Kosuth¤, Thomas Braukmann‡, Tom Woodcock§, Tomas Roslin¤¤,«», Tony Zammit»», Victoria Campbell‡, Vlad Dinca‡, Vlada Peneva˄˄, Paul D N Hebert‡, Jeremy R deWaard‡

‡ Biodiversity Institute of Ontario, Guelph, Canada
§ rare Charitable Research Reserve, Cambridge, Canada
| CNC, Ottawa, Canada
¶ Muséum national d'Histoire Naturelle, Paris, France
# University of Waterloo, Waterloo, Canada
¤ Université de Montpellier, Montpellier, France
« EcoBio, Université of Rennes, Rennes, France
» rare Charitable Research Reserve (Affiliate of), Cambridge, Canada
˄ Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN-CONICET), Buenos Aires, Argentina
˅ Biodiversity Institute of Ontario Herbarium, Guelph, Canada
¦ University of Waikato, Hamilton, New Zealand
ˀ University of Western Ontario, London, Canada
ˁ University of Guelph, Guelph, Canada

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¢ Universidad Autonoma de Santo Domingo DR, Santo Domingo, Dominican Republic
ℓ Myotistar, Cambridge, Canada
৯ SNSB, Zoologische Staatssammlung Muenchen, Munich, Germany
₱ Grand River Conservation Authority, Guelph, Canada
₳ The University of Western Australia, Perth, Australia
₴ National Biodiversity Centre, Thimphu, Bhutan
₣ Ministry of Environment and Tourism in Namibia, Windhoek, Namibia
₮ University of Oulu, Oulu, Finland
₦ The University of Western Ontario, London, Canada
₭ Pensoft, Sofia, Bulgaria
₲ Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá, Colombia
? Smithsonian National Museum of Natural History, Washington, United States of America
₩ Universidad Nacional Autónoma de México, Mexico City, Mexico
₸ ANSES, Laboratoire de la Santé des Végétaux, Montferrier sur Lez, France
‡‡ New Brunswick Museum, Saint John, Canada
§§ London Homeopathy, London, Canada
|| Ministry of Forests and Soil Conservation, Kathmandu, Nepal
¶¶ Scientific and Practical Center for Bioresources, National Academy of Sciences of Belarus, Minsk, Belarus
Université de Montpellier Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier, France
¤¤ University of Helsinki, Helsinki, Finland
«« Swedish University of Agricultural Sciences, Uppsala, Sweden
»» Grand River Conservation Authority, Cambridge, Canada
^^ Bulgarian Academy of Sciences, Sofia, Bulgaria

Corresponding author: Angela C Telfer (atelfer@uoguelph.ca), Jeremy R deWaard (dewaardj@uoguelph.ca)

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Abstract

Background

Comprehensive biotic surveys, or ‘all taxon biodiversity inventories’ (ATBI), have traditionally been limited in scale or scope due to the complications surrounding specimen sorting and species identification. To circumvent these issues, several ATBI projects have successfully integrated DNA barcoding into their identification procedures and witnessed

acceleration in their surveys and subsequent increase in project scope and scale. The Biodiversity Institute of Ontario partnered with the ***rare*** **Charitable Research Reserve** and delegates of the 6th International Barcode of Life Conference to complete its own rapid, barcode-assisted ATBI of an established land trust in Cambridge, Ontario, Canada.

New information

The existing species inventory for the ***rare*** **Charitable Research Reserve** was rapidly expanded by integrating a DNA barcoding workflow with two surveying strategies – a comprehensive sampling scheme over four months, followed by a one-day bioblitz involving international taxonomic experts. The two surveys resulted in 25,287 and 3,502 specimens barcoded, respectively, as well as 127 human observations. This barcoded material, all vouchered at the Biodiversity Institute of Ontario collection, covers 14 phyla, 29 classes, 117 orders, and 531 families of animals, plants, fungi, and lichens. Overall, the ATBI documented 1,102 new species records for the nature reserve, expanding the existing long-term inventory by 49%. In addition, 2,793 distinct Barcode Index Numbers (BINs) were assigned to genus or higher level taxonomy, and represent additional species that will be added once their taxonomy is resolved. For the 3,502 specimens, the collection, sequence analysis, taxonomic assignment, data release and manuscript submission by 100+ co-authors all occurred in less than one week. This demonstrates the speed at which barcode-assisted inventories can be completed and the utility that barcoding provides in minimizing and guiding valuable taxonomic specialist time. The final product is more than a comprehensive biotic inventory – it is also a rich dataset of fine-scale occurrence and sequence data, all archived and cross-linked in the major biodiversity data repositories. This model of rapid generation and dissemination of essential biodiversity data could be followed to conduct regional assessments of biodiversity status and change, and potentially be employed for evaluating progress towards the Aichi Targets of the Strategic Plan for Biodiversity 2011–2020.

Keywords

DNA barcoding, species identification, biodiversity assessment, biotic inventory, Barcode Index Numbers, Operational Taxonomic Units, *rare* Charitable Research Reserve

Introduction

It is now universally accepted that we have entered a period of unprecedented global biodiversity loss (Simberloff 1996, Pimm et al. 1995, Pimm et al. 2014), and quantifying this diversity rapidly and on a massive scale is required to begin the challenging process of halting this trend. The completion of biodiversity inventories at various geographic and time scales can contribute to national and international assessments of biodiversity knowledge, deemed necessary by the newly established Intergovernmental Science-Policy Platform on

Biodiversity and Ecosystem Services (Díaz et al. 2015). These assessments are fundamental for evaluating progress towards – and potentially reaching – the Convention on Biological Diversity's Aichi Targets of the Strategic Plan for Biodiversity 2011–2020 (https://www.cbd.int/sp/targets/). Specifically, biodiversity inventories address a component of Aichi target 19, to improve and disseminate biodiversity knowledge, particularly its status and trends.

Even prior to the concept's introduction (Janzen and Hallwachs 1994), several 'all taxon biodiversity inventories' (ATBI) and similar initiatives emerged to document large blocks of life in a circumscribed region or protected area. These comprehensive biotic surveys, particularly those in tropical locales, have traditionally been mired at the stage of specimen sorting and species identification. The taxonomic impediment – the shortage of taxonomic information and the gaps in our taxonomic knowledge – have severely limited and slowed the sorting and naming of collected material (Janzen 1993, Lawton et al. 1998, Janzen 2004). The integration of DNA barcoding however, has simplified, accelerated, and democratized this task (Hebert et al. 2003, Packer et al. 2009, Cristescu 2014, Joly et al. 2014). Several ATBI projects have now successfully integrated DNA barcoding into their identification procedures, observed this acceleration, and in many cases, even increased the scope or scale of their project as a result. A few notable ATBIs that have incorporated DNA barcoding for species identification include projects in the Área de Conservación Guanacaste, Costa Rica (Janzen et al. 2009), Churchill, Canada (Zhou et al. 2009), Great Smoky Mountains, United States (Zhou et al. 2011), Madang, Papua New Guinea (Novotny et al. 2007), Moorea, French Polynesia (Check 2006), Zackenberg, Greenland (Wirta et al. 2015), and Mount Kinabalu, Malaysia (Merckx et al. 2015).

Following this model, the present study introduces DNA barcoding to a long-term biotic inventorying effort being conducted in a temperate nature reserve. The objective is to gauge the effect of adding this tool, in terms of both acceleration and increase of taxonomic scope, while concurrently constructing a reference DNA barcode library to facilitate future research and monitoring at this site. The existing inventory is expanded by employing two surveying strategies – a longer and comprehensive invertebrate trapping scheme, followed by a concentrated effort involving taxonomic experts in the form of a bioblitz (Lundmark 2003). In both cases, DNA barcoding is employed to sort the material rapidly into operational taxonomic units (OTUs), provide taxonomic assignment at varying levels of resolution depending on the taxon group, and organize the OTUs and linked specimen vouchers for examination by experts. The results demonstrate the speed at which barcode-assisted surveys can be completed, the role that barcoding plays in limiting and optimizing valuable taxonomic specialist time, and ultimately, a scalable model for rapid biotic surveys and dissemination of the rich biodiversity data captured. The product is not merely a comprehensive biotic inventory, but also a rich dataset of fine-scale occurrence and sequence data, all stored and cross-linked in several public biodiversity data repositories.

Materials and methods

Study Site and Existing Species Inventory

The ***rare* Charitable Research Reserve** is a 365+ hectare land reserve which was set aside in 2001 to preserve the cultural history and ecological integrity of the area, while providing opportunities for scientific research and public education within the context of an urbanized region. It is located at the confluence of the Speed and Grand Rivers in Cambridge, Ontario, Canada (43.381128, -80.357807), where the Carolinian and Northern Hardwood forests also meet. The reserve contains a diversity of habitats including existing and reclaimed agricultural lands, wetlands, floodplains, shrub thickets, limestone cliffs and alvars, cold-water creeks, and old growth forest. Due to these diverse habitats, as well as the organization's mandate to facilitate scientific research, ***rare*** has been the site of a variety of innovative research studies, including studies on fern genetics (Henry et al. 2014), prairie community establishment (Harvey and MacDougall 2014), and pollination services (Woodcock et al. 2014). For the present study, we chose sampling sites to encompass a wide range of habitats within the area. In advance of the bioblitz, sampling was conducted within an alvar, reclaimed agricultural fields, forest edges, and a wetland (Fig. 1). Six additional sites were sampled for the bioblitz: terrestrial and aquatic sampling was performed at the Grand River, Blair Flats Wetland, and Cruickston Creek; terrestrial sampling was conducted at an alvar, a cedar stand, and a silver maple wetland (Fig. 1). The wetlands on the reserve are part of the Barrie's Lake Bauman Creek Wetland Complex, which has been classified as a Provincially Significant Wetland by the Ontario Ministry of Natural Resources. Much of the property is also considered locally significant by the Regional Municipality of Waterloo.

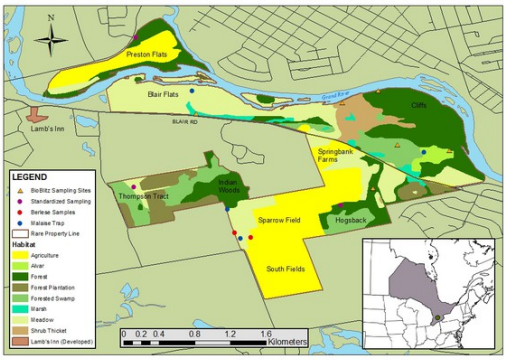

Figure 1.

Map indicating habitat types and sampling sites for the 2015 biotic survey conducted at ***rare* Charitable Research Reserve** in Cambridge, Ontario, Canada.

Prior to this study, 2,246 species had been recorded at ***rare***, including birds (231), mammals (37), insects (832), plants (836), mosses (63) and lichens (21) (Suppl. material 1; note that 218 species still require confirmation, denoted by parentheses). These observations have come from a variety of sources including ***rare*** staff and advisors, citizen scientists, and academic researchers, some of whom have made notable contributions to this inventory, such as Woodcock et al. 2014 who added 150 species of pollinators. Others have provided observations of rarely encountered species, such as the rove beetles *Xantholinus elegans* (Olivier, 1795) (first record for North America) and *Xantholinus linearis* (Olivier, 1794) (previously known from the east coast of Canada, now present in Ontario) (Brunke and Majka 2010). The ***rare*** reserve also hosts several species that fall on the provincial or national lists of conservation concern: 1% of the total have a status ranging from special concern, threatened or endangered (15, 6 and 7 species, respectively), while 1.5% have an undefined status of rare or uncommon (15 and 19 species, respectively). Several of these species, such as the barn swallow [*Hirundo rustica* (Linnaeus, 1758)], which has been nationally listed as threatened since 2011, are the subjects of active recovery projects at ***rare***. Similar to many species inventories, ***rare's*** list is evidently more complete for charismatic and well-studied taxa, such as birds, butterflies and vascular plants. The observations for these groups would be enabled by excellent field guides and the disproportionate interest of citizen scientists; the opposite would be the case for most invertebrate taxa, and ***rare's*** inventory reflects this. If it is assumed that the proportions of major taxonomic groups inhabiting this reserve resemble those for similar temperate sites (e.g., Great Smoky Mountains: Sharkey 2001) or the Canadian terrestrial and freshwater biota in general (Mosquin et al. 1995), this inventory is deficient in several major groups such as insects, arachnids, nematodes, fungi and lichens. The supporting data for most species entries are also lacking, such as specific locality, date or identifier of each observation. In addition, the bioblitz has highlighted errors in the inventory which may have been present due to the compilation of observations from a variety of sources including non-experts. Furthermore, nearly all observations are not supported by voucher specimens or images to permit verification (Bortolus 2008).

Survey Strategies and Specimen Collection

Two strategies were employed in an effort to maximize the diversity of organisms inventoried. The first was a comprehensive collecting scheme executed over a period of approximately four months (May to August 2015). It involved a variety of targeted taxa and techniques, but heavily favoured the collection of terrestrial arthropods by passive trapping. Four Malaise traps were set up in various habitats around the ***rare*** property (Fig. 1) and were serviced weekly. Three pitfall traps were set up in close proximity to each Malaise trap and serviced in parallel. From May 25-31 and July 6-12, 2015, 'standardized sampling' procedures developed by the Biodiversity Institute of Ontario were employed at three different sites at ***rare*** (Fig. 1). Standardized sampling includes 20 pitfall traps, 10 pan traps, three litter and/or soil samples for Berlese funnels, one flight intercept trap and one Malaise trap – all deployed for a total of seven days. Standardized sampling also includes 60 total minutes of sweep netting, which is performed in three sessions with four collectors sweep netting for five consecutive minutes simultaneously. Each session is pooled into one

sample and preserved in 95% ethanol. Passive traps (pitfall, pan, intercept) were deployed with soapy water and serviced every two days, while the Malaise trap used 95% ethanol and ran for the duration of the collecting period. All specimens collected through this standardized sampling routine were consolidated into individual jars for each technique. From July 23 to Aug 13, 2015, at least two ultraviolet light traps were deployed for one night per week; each trap was left overnight using ethyl acetate as a killing agent. On August 5, 2015, several aquatic samples were collected using stable dip nets for surber sampling, deploying hand nets along the stream banks and selective turning of stones to recover macroinvertebrates hiding below. Then the sample was passed through a 50 µm mesh net to capture the smaller invertebrates. All specimens collected from these samples were preserved in 95% ethanol. This first strategy of comprehensive sampling over several months was conducted by technical staff, including undergraduate students, and completed on Aug 15, 2015.

The second strategy for surveying the reserve was a more concentrated effort and involved taxonomic experts – the execution of a bioblitz (Lundmark 2003). Termed the '***rare*** BioBlitz', the event involved 113 participants from 31 institutions and coincided with the 6th International Barcode of Life Conference (Adamowicz 2015). Collection efforts at the bioblitz were focused on six sites selected based on habitat diversity, proximity, and potential species diversity (Fig. 1). Sampling efforts were concentrated between 1-3 pm and 9-11 pm and targeted taxa that fell within the expertise of the participants and in groups underrepresented in the ***rare*** inventory (e.g., spiders, parasitic wasps, mites, nematodes, fungi, and lichens). Various methods for collecting both terrestrial and aquatic arthropods were employed, including dip nets, seine nets, sweep netting, and plankton netting. Small teams surveyed the property and adjacent rivers for taxonomic groups not collected in the four previous months, including fungi, lichens, and vascular plants. Since the inventory is fairly complete for vascular plants (836 species), an effort was made to barcode all species of Blair Flats, a tall grass prairie site that is an active research site (e.g., Harvey and MacDougall 2014). For these taxa, specimens were collected in the field into bags and processed afterward (e.g., pressed and dried onto herbarium sheets). Fungal specimens were collected and processed in a similar manner. Several taxa were targeted for sightings only, where no voucher specimens were collected; these groups included fish, birds, bats, herptiles and odonates (for bat sightings protocol, see Suppl. material 2). All collected specimens were sorted and identified to the lowest taxonomic level possible by the appropriate expert, both on site and following the event from August 16-20, 2015. Vertebrates, plants, fungi and lichens were almost all identified to species, while most invertebrate specimens were assigned to order or family prior to analysis. Invertebrate specimens were either stored in 95% ethanol or pinned after collection. For all invertebrate, plant, and fungal taxa, voucher specimens were collected where possible and deposited in the Biodiversity Institute of Ontario's natural history collection (BIOUG) or herbarium (BIO-OAC) for permanent storage (Schilthuizen et al. 2015).

DNA Barcode Analysis

Both surveying strategies provided a large number of specimens that were sorted and prepared for subsequent DNA barcode analyses at the Canadian Centre for DNA barcoding (CCDB; www.ccdb.ca). A total of 25,287 specimens were sequenced from collection efforts from May to August 2015, followed by 3,502 specimens directly following the ***rare*** BioBlitz on Aug 16, 2015. Tissue samples were prepared in 96-well plate format and when necessary, the whole specimen proceeded through lysis and was recovered as voucher from the filter plate (Porco et al. 2010). Tissue lysis and DNA extraction varied slightly for different taxa (Suppl. material 3), but followed standard CCDB procedures (Ivanova et al. 2006, deWaard et al. 2008, Ivanova et al. 2008, Ivanova et al. 2011, Fazekas et al. 2012).

One or more standard DNA barcode markers were targeted for each major group of organisms: for animals, the mitochondrial gene *cytochrome oxidase subunit 1* (COI) (Hebert et al. 2003); for plants, the plastid marker *rbcL* (Hollingsworth et al. 2009) and the nuclear ribosomal internal transcribed spacer 2 (ITS2) marker (Hollingsworth 2011, Schoch et al. 2012); and for fungi and lichens (where only the fungal component was targeted), the internal transcribed spacer (ITS) marker (Schoch et al. 2012). PCR amplification, cycle sequencing and sequence analysis followed typical CCDB protocols (Ivanova and Grainger 2006, Kuzmina and Ivanova 2011). The primer cocktails used for PCR and sequencing are detailed in Suppl. material 3. The sequences were manually assembled and edited before upload to in the Barcode of Life Data Systems (BOLD, www.boldsystems.org) (Ratnasingham and Hebert 2007). The DNA extracts for all specimens are stored in the DNA Archive of the CCDB where they are available for additional study.

Barcode Index Numbers and Taxonomic Assignment

For the sequences derived from animal specimens, the records were assigned operational taxonomic units (OTUs) called Barcode Index Numbers (BINs) by the Refined Single Linkage (RESL) algorithm implemented on BOLD (Ratnasingham and Hebert 2013). For the sequences that have at least 500 bp coverage of the barcode region, < 1% ambiguous bases, and no stop codon or contamination flags, the RESL algorithm calculates the number of clusters and their membership (see Ratnasingham and Hebert 2013). The RESL algorithm runs weekly on all qualifying barcode sequences in BOLD, which as of August 2015, includes 5M specimens and 420K BINs. The BIN system is accessible through public, individual 'BIN pages' and permits rapid diversity assessments, even in the absence of taxonomic information. BINs show a high concordance with traditional taxonomic species names and can be used as a reliable proxy for species.

For each specimen that was assigned an existing BIN, the record received the existing identification of the BIN to the lowest level that did not have taxonomic conflict. For each specimen assigned a new BIN for BOLD, the sequence was queried through the BOLD Identification Engine (BOLD-ID Engine; http://www.boldsystems.org/index.php/IDS_OpenIdEngine). Identifications were applied based on sequence similarity (<15% for family, <5%

for genus) if the query sequence fell within a monophyletic cluster of BINs assigned to this family or genus. For animal records that did not receive BINs (<500bp), the sequence was similarly queried through the BOLD-ID Engine, but used a <2% similarity cutoff for assignment to species, in addition to the genus and family thresholds. Following this, a neighbour-joining tree was constructed and examined for unexpected placements which might indicate overlooked contamination events or analytical error. Finally, specimens and images were inspected morphologically to check for errors and refine the assigned taxonomy where possible.

Data resources

Collection data, taxonomic assignment, sequence, electropherograms and primer details for each specimen record, and often a high resolution image, are available on BOLD in the public dataset, "***rare*** BioBlitz 2015 [DS-RBB15]" (http://dx.doi.org/10.5883/DS-RBB15 or http://boldsystems.org/index.php/MAS_Management_OpenDataSet?datasetcode=DS-RBB15). The sequence data for each successfully barcoded specimen were deposited to GenBank by using the 'Submit to GenBank' function in the BOLD workbench (see Suppl. material 4 for accession numbers).

With the 'Data Spreadsheets' function in the BOLD workbench, the complete dataset was downloaded and reformatted into a Darwin Core Archive (Suppl. material 5) for upload to the Canadensys repository (http://www.canadensys.net), Canada's national node for the Global Biodiversity Information Facility (http://www.gbif.org). The online resource (http://doi.org/10.5886/hh6td9jn) contains all records of the 2015 inventory, including human observations. The citation for the resource is as follows:

Telfer A, Young MR, Quinn J, Perez K, Sobel CN, Sones JE, Levesque-Beaudin V, Derbyshire R, Fernandez-Triana J, Rougerie R, Hebert PDN, deWaard JR and contributors* (2015+). Inventory and BioBlitz Records from ***rare*** **Charitable Research Reserve**. 28,916 records. Online at http://data.canadensys.net/ipt/resource.do?r=rare_inventory, http://doi.org/10.5886/hh6td9jn, and http://www.gbif.org/dataset/09e90dfb-5b1b-4dd9-a796-e2fba53d26f0, released on 2015-08-20, version 1. GBIF key: 09e90dfb-5b1b-4dd9-a796-e2fba53d26f0.

* See Suppl. material 6 for complete list of contributors, institutions and email addresses

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The first of five checklists for Kingdom Animalia, this checklist contains members of Phylum Annelida and Phylum Arthopoda (Class Arachnida and Class Insecta up to Order Dermaptera).

Kingdom Animalia
Phylum Annelida
Class Clitellata
Order Arhynchobdellida
Family Erpobdellidae
Erpobdella punctata Leidy, 1870
Order Haplotaxida
Family Lumbricidae
Lumbricus terrestris Linnaeus, 1758
Phylum Arthropoda
Class Arachnida
Order Araneae
Family Agelenidae
Agelenopsis potteri Blackwall, 1846
Family Amaurobiidae
Callobius bennetti Blackwall, 1846
Notes: BOLD:AAB8212
Family Anyphaenidae
Anyphaena celer Hentz, 1847
Anyphaena pectorosa L. Koch, 1866
Notes: BOLD:AAD6926
Hibana gracilis Hentz, 1847
Notes: BOLD:AAN6394
Wulfila saltabundus Hentz, 1847
Notes: BOLD:AAC6924

Family Araneidae

Acanthepeira stellata Walckenaer, 1805
Notes: BOLD:AAD7855

Araneus diadematus Clerck, 1757
Notes: BOLD:AAA4125

Araneus trifolium Hentz, 1847
Notes: BOLD:AAB8544

Araniella displicata Hentz, 1847
Notes: BOLD:AAA8399

Argiope aurantia Lucas, 1833
Notes: BOLD:AAB7933

Argiope trifasciata Forsskål, 1775

Eustala anastera Walckenaer, 1841
Notes: BOLD:AAL4913

Eustala cepina Walckenaer, 1841
Notes: BOLD:AAB7935

Eustala emertoni Banks, 1904

Hypsosinga pygmaea Sundevall, 1831
Notes: BOLD:ABX6180

Hypsosinga rubens Hentz, 1847
Notes: BOLD:AAN6264

Larinioides cornutus Clerck, 1757
Notes: BOLD:AAA8999

Larinioides patagiatus Clerck, 1757

Mangora gibberosa Hentz, 1847
Notes: BOLD:AAB7330

Mangora maculata Keyserling, 1865

Mangora placida Hentz, 1847
Notes: BOLD:AAI4456|BOLD:ACE4103

Neoscona arabesca Walckenaer, 1841
Notes: BOLD:AAA4123

Family Clubionidae

Clubiona abboti L. Koch, 1866
Notes: BOLD:AAD1564

Clubiona bryantae Gertsch, 1941

Clubiona johnsoni Gertsch, 1941

Notes: BOLD:AAN4847

Clubiona maritima L. Koch, 1867

Notes: BOLD:AAI4085

Clubiona obesa Hentz, 1847

Notes: BOLD:AAD5417

Clubiona pallidula Clerck, 1757

Notes: BOLD:AAI4087

Family Dictynidae

Cicurina brevis Emerton, 1890

Notes: BOLD:AAC8284

Cicurina itasca Chamberlin & Ivie, 1940

Notes: BOLD:AAI4031

Cicurina pallida Keyserling, 1887

Notes: BOLD:AAF3046

Dictyna bellans Chamberlin, 1919

Notes: BOLD:AAI6249

Dictyna bostoniensis Emerton, 1888

Notes: BOLD:AAL1061

Dictyna brevitarsa Emerton, 1915

Notes: BOLD:AAB2306

Dictyna foliacea Hentz, 1850

Notes: BOLD:AAI6247

Dictyna volucripes Keyserling, 1881

Notes: BOLD:AAB1638|BOLD:ACE2869

Emblyna annulipes Blackwall, 1846

Emblyna hentzi Kaston, 1945

Notes: BOLD:AAI6251

Emblyna manitoba Ivie, 1947

Notes: BOLD:AAI9209

Emblyna sublata Hentz, 1850

Notes: BOLD:AAA7272

Family Gnaphosidae

Drassyllus depressus Emerton, 1890
Notes: BOLD:AAD8676

Drassyllus niger Banks, 1896
Notes: BOLD:AAI9037

Gnaphosa parvula Banks, 1896
Notes: BOLD:AAC3779

Haplodrassus signifer C. L. Koch, 1839
Notes: BOLD:AAD0462

Herpyllus ecclesiasticus Hentz, 1832
Notes: BOLD:AAF2106

Micaria pulicaria Sundevall, 1831
Notes: BOLD:AAC6612

Sergiolus ocellatus Walckenaer, 1837
Notes: BOLD:ACV6055

Zelotes hentzi Barrows, 1945
Notes: BOLD:AAA8914

Zelotes pseustes Chamberlin, 1922

Family Hahniidae

Neoantistea agilis Keyserling, 1887
Notes: BOLD:ACV5090

Neoantistea gosiuta Gertsch, 1934
Notes: BOLD:AAG9583

Family Linyphiidae

Agyneta fabra Keyserling, 1886
Notes: BOLD:AAE3860

Agyneta micaria Emerton, 1882
Notes: BOLD:AAN6265

Agyneta unimaculata Banks, 1892
Notes: BOLD:AAH0003

Bathyphantes brevis Emerton, 1911
Notes: BOLD:AAC5851

Bathyphantes pallidus **Banks, 1892**
Notes: BOLD:AAC9112

Centromerus sylvaticus **Blackwall, 1841**
Notes: BOLD:AAA4132

Ceraticelus atriceps **O. P.-Cambridge, 1874**
Notes: BOLD:AAI3701

Ceraticelus similis **Banks, 1892**
Notes: BOLD:AAF1318

Ceratinella brunnea **Emerton, 1882**
Notes: BOLD:AAD2101

Ceratinops crenatus **Emerton, 1882**
Notes: BOLD:ACF8798

Ceratinops latus **Emerton, 1882**
Notes: BOLD:AAI5447

Ceratinopsis auriculata **Emerton, 1909**
Notes: BOLD:ACR6338

Ceratinopsis labradorensis **Emerton, 1925**
Notes: BOLD:ACV5182

Collinsia plumosa **Emerton, 1882**
Notes: BOLD:AAM9146

Eridantes erigonoides **Emerton, 1882**
Notes: BOLD:AAH0004

Erigone atra **Blackwall, 1833**
Notes: BOLD:ACE5877

Erigone autumnalis **Emerton, 1882**
Notes: BOLD:AAH0001

Erigone blaesa **Crosby & Bishop, 1928**
Notes: BOLD:ACE9601

Frontinella communis **Hentz, 1850**
Notes: BOLD:AAE0825

Grammonota angusta **Dondale, 1959**
Notes: BOLD:AAD1498

Grammonota inornata **Emerton, 1882**
Notes: BOLD:ACV5737

Hypomma marxi **Keyserling, 1886**
Notes: BOLD:AAB9520

Hypselistes florens **O. P.-Cambridge, 1875**
Notes: BOLD:AAB4233

Mermessus index **Emerton, 1914**
Notes: BOLD:ACL4554

Mermessus trilobatus **Emerton, 1882**
Notes: BOLD:AAC8898

Microlinyphia mandibulata **Emerton, 1882**
Notes: BOLD:AAF4994

Neriene clathrata **Sundevall, 1830**
Notes: BOLD:AAA8358|BOLD:AAB7327

Neriene montana **Clerck, 1757**

Neriene variabilis **Banks, 1892**

Pityohyphantes costatus **Hentz, 1850**

Pityohyphantes subarcticus **Chamberlin & Ivie, 1943**

Pocadicnemis americana **Millidge, 1976**
Notes: BOLD:AAC9060

Tennesseellum formica **Emerton, 1882**
Notes: BOLD:AAG5631

Tenuiphantes zebra **Emerton, 1882**
Notes: BOLD:AAI8098

Walckenaeria directa **O. P.-Cambridge, 1874**
Notes: BOLD:AAH8313

Walckenaeria fallax **Millidge, 1983**
Notes: BOLD:AAH8314

Walckenaeria pinocchio **Kaston, 1945**
Notes: BOLD:ACT1115

Walckenaeria spiralis **Emerton, 1882**
Notes: BOLD:AAH8314

Family Lycosidae

Arctosa emertoni Gertsch, 1934
Notes: BOLD:ACW1682

Pardosa distincta Blackwall, 1846
Notes: BOLD:AAC7802

Pardosa milvina Hentz, 1844
Notes: BOLD:AAB7668

Pardosa modica Blackwall, 1846
Notes: BOLD:AAA5090

Pardosa moesta Banks, 1892
Notes: BOLD:AAB0863

Pardosa saxatilis Hentz, 1844
Notes: BOLD:AAB7667

Pirata piraticus Clerck, 1757
Notes: BOLD:AAB6784

Pirata praedo Kulczynski, 1885
Notes: BOLD:AAC5349

Piratula cantralli Wallace & Exline, 1978
Notes: BOLD:ABZ5613

Piratula minuta Emerton, 1885
Notes: BOLD:AAE4247

Schizocosa avida Walckenaer, 1837
Notes: BOLD:AAD3880

Schizocosa crassipalpata Roewer, 1951
Notes: BOLD:AAC4687

Schizocosa mccooki Montgomery, 1904
Notes: BOLD:AAH0055

Schizocosa ocreata Hentz, 1844
Notes: BOLD:AAA7232

Trochosa ruricola De Geer, 1778
Notes: BOLD:AAB0726

Trochosa terricola Thorell, 1856
Notes: BOLD:AAB0727

Family Mimetidae

Mimetus epeiroides Emerton, 1882
Notes: BOLD:AAG5658

Mimetus haynesi Gertsch & Mulaik, 1940
Notes: BOLD:AAK6284

Mimetus notius Chamberlin, 1923

Family Philodromidae

Philodromus cespitum Walckenaer, 1802
Notes: BOLD:AAB3836

Philodromus imbecillus Keyserling, 1880
Notes: BOLD:AAI2838

Philodromus praelustris Keyserling, 1880
Notes: BOLD:AAD2665

Philodromus rufus subsp. *vibrans* Dondale

Thanatus coloradensis Keyserling, 1880
Notes: BOLD:AAM7986

Tibellus maritimus Menge, 1875
Notes: BOLD:AAA7188

Tibellus oblongus Walckenaer, 1802
Notes: BOLD:AAA7188

Family Phrurolithidae

Phrurotimpus borealis Emerton, 1911
Notes: BOLD:AAC7234

Scotinella pugnata Emerton, 1890
Notes: BOLD:AAK7452

Family Pisauridae

Dolomedes striatus Giebel, 1869
Notes: BOLD:ACI5773

Dolomedes tenebrosus Hentz, 1844

Pisaurina mira Walckenaer, 1837
Notes: BOLD:AAI2721

Family Salticidae

Eris militaris Hentz, 1845
Notes: BOLD:AAA5654

Evarcha hoyi **Peckham & Peckham, 1883**
Notes: BOLD:AAC0342|BOLD:ACL8050

Habronattus decorus **Blackwall, 1846**

Marpissa formosa **Banks, 1892**
Notes: BOLD:AAG0312

Naphrys pulex **Hentz, 1846**
Notes: BOLD:AAC2433

Neon nelli **Peckham & Peckham, 1888**
Notes: BOLD:AAD9221

Pelegrina galathea **Walckenaer, 1837**
Notes: BOLD:AAB2930

Pelegrina insignis **Banks, 1892**
Notes: BOLD:AAB2928

Pelegrina proterva **Walckenaer, 1837**

Phidippus audax **Hentz, 1845**

Phidippus clarus **Keyserling, 1885**

Salticus scenicus **Clerck, 1757**

Sitticus floricola **subsp.** ***palustris*** **Peckham and Peckham, 1883**

Synageles noxiosus **Hentz, 1850**
Notes: BOLD:ACL8115

Tutelina harti **Peckham, 1891**
Notes: BOLD:AAW8769

Tutelina similis **Banks, 1895**
Notes: BOLD:AAF6387

Zygoballus nervosus **Peckham & Peckham, 1888**
Notes: BOLD:ACA1490

Family Tetragnathidae

Leucauge venusta **Walckenaer, 1841**
Notes: BOLD:AAB8714

Pachygnatha dorothea **McCook, 1894**
Notes: BOLD:AAE5304

Pachygnatha tristriata **C. L. Koch, 1845**
Notes: BOLD:AAF1571

Pachygnatha xanthostoma **C. L. Koch, 1845**
Notes: BOLD:ACO7247|BOLD:ACP5884|BOLD:ACU5364

Tetragnatha caudata **Emerton, 1884**
Notes: BOLD:AAE3958|BOLD:ACN4034|BOLD:AAP3715

Tetragnatha extensa **Linnaeus, 1758**

Tetragnatha guatemalensis **O. P.-Cambridge, 1889**

Tetragnatha laboriosa **Hentz, 1850**
Notes: BOLD:AAA6381|BOLD:ACR6860

Tetragnatha shoshone **Levi, 1981**
Notes: BOLD:AAB7995

Tetragnatha straminea **Emerton, 1884**
Notes: BOLD:AAD7095

Tetragnatha viridis **Walckenaer, 1841**
Notes: BOLD:AAG5659|BOLD:AAN6335

Family Theridiidae

Dipoena nigra **Emerton, 1882**
Notes: BOLD:AAF4974

Enoplognatha caricis **Fickert, 1876**
Notes: BOLD:AAO3896

Enoplognatha ovata **Clerck, 1757**
Notes: BOLD:AAA6910

Euryopis funebris **Hentz, 1850**
Notes: BOLD:AAJ0542

Hentziectypus globosus **Hentz, 1850**
Notes: BOLD:AAN6263

Neospintharus trigonum **Hentz, 1850**
Notes: BOLD:AAB0273

Neottiura bimaculata **Linnaeus, 1767**
Notes: BOLD:AAK8332|BOLD:ACN7831

Parasteatoda tabulata **Levi, 1980**

Parasteatoda tepidariorum **C. L. Koch, 1841**
Notes: BOLD:AAC0175

Theridion albidum Banks, 1895
Notes: BOLD:AAV3042

Theridion differens Emerton, 1882
Notes: BOLD:AAC3269

Theridion glaucescens Becker, 1879
Notes: BOLD:AAG1794

Theridion murarium Emerton, 1882
Notes: BOLD:AAC6350

Theridula emertoni Levi, 1954
Notes: BOLD:AAD2291

Thymoites unimaculatus Emerton, 1882
Notes: BOLD:AAE7853

Yunohamella lyrica Walckenaer, 1841
Notes: BOLD:AAG4815

Family Thomisidae

Mecaphesa asperata Hentz, 1847
Notes: BOLD:ACE7683

Misumena vatia Clerck, 1757
Notes: BOLD:AAA6275

Misumenoides formosipes Walckenaer, 1837

Misumessus oblongus Keyserling, 1880

Ozyptila americana Banks, 1895

Ozyptila praticola C. L. Koch, 1837
Notes: BOLD:AAC7413

Tmarus angulatus Walckenaer, 1837
Notes: BOLD:ABY7475

Xysticus bicuspis Keyserling, 1887
Notes: BOLD:AAJ9685

Xysticus discursans Keyserling, 1880
Notes: BOLD:AAJ9718|BOLD:ACV2014|BOLD:ACV5078

Xysticus elegans Keyserling, 1880
Notes: BOLD:AAC1568

Xysticus emertoni **Keyserling, 1880**

Notes: BOLD:AAB4300

Xysticus funestus **Keyserling, 1880**

Xysticus luctans **C. L. Koch, 1845**

Notes: BOLD:AAF8190

Xysticus punctatus **Keyserling, 1880**

Notes: BOLD:AAD2346

Xysticus winnipegensis **Turnbull, Dondale & Redner, 1965**

Notes: BOLD:AAM6956

Family Uloboridae

Uloborus glomosus **Walckenaer, 1841**

Notes: BOLD:AAJ7823

Order Mesostigmata

Family Ascidae

Arctoseius cetratus **Sellnick, 1940**

Notes: BOLD:ACF8021

Family Rhodacaridae

Rhodacarellus silesiacus **Willmann, 1935**

Order Opiliones

Family Phalangiidae

Oligolophus tridens **C. L. Koch, 1836**

Notes: BOLD:AAM8194

Phalangium opilio **Linnaeus, 1758**

Notes: BOLD:AAI4346

Platybunus triangularis **Herbst, 1799**

Notes: BOLD:ABW0506

Family Sclerosomatidae

Leiobunum aldrichi **Weed, 1893**

Notes: BOLD:AAH7061

Leiobunum ventricosum **Wood, 1868**

Order Sarcoptiformes

Family Euzetidae

Euzetes globulus **Nicolet, 1855**

Notes: BOLD:AAF9090

Family Gustaviidae

Gustavia microcephala Nicolet, 1855

Notes: BOLD:ACE3149

Family Liacaridae

Dorycranosus acutidens Aoki, 1965

Notes: BOLD:AAF9274

Family Mochlozetidae

Podoribates pratensis Banks, 1895

Notes: BOLD:AAF9173

Family Mycobatidae

Punctoribates punctum Koch, 1839

Notes: BOLD:AAH6516|BOLD:ACB6310

Family Oppiidae

Oppia nitens Koch, 1836

Notes: BOLD:AAF0868

Family Oribatulidae

Oribatula tibialis Nicolet, 1855

Notes: BOLD:ACI4357

Family Scheloribatidae

Scheloribates clavilanceolatus Ewing, 1907

Notes: BOLD:AAF9097

Family Tectocepheidae

Tectocepheus sarekensis Trägårdh, 1910

Notes: BOLD:AAM3402|BOLD:AAM4355

Order Trombidiformes

Family Arrenuridae

Arrenurus reflexus Marshall, 1908

Notes: BOLD:AAE6722

Class Branchiopoda

Order Diplostraca

Family Bosminidae

***Bosmina liederi* De Melo and Hebert, 1994**

Family Eurycercidae

***Eurycercus longirostris* Hann, 1982**

Class Chilopoda

Order Geophilomorpha

Family Schendylidae

***Schendyla nemorensis* C.L.Koch, 1837**

Notes: BOLD:AAG8560

Order Lithobiomorpha

Family Lithobiidae

***Lithobius microps* Meinert, 1868**

Notes: BOLD:AAH6432

Class Collembola

***Entomobrya atrocincta* Schott, 1896**

Notes: BOLD:ACE5102

Family Entomobryidae

***Entomobrya nivalis* Linnaeus, 1758**

Notes: BOLD:ACL6239

***Lepidocyrtus paradoxus* Uzel, 1891**

***Orchesella villosa* Linnaeus, 1767**

Notes: BOLD:AAA8726

***Pseudosinella octopunctata* Boerner, 1901**

Notes: BOLD:AAA9292

Family Isotomidae

***Parisotoma notabilis* Schaffer, 1896**

Order Poduromorpha

Family Hypogastruridae

***Ceratophysella bengtssoni* Ågren, 1904**

Notes: BOLD:AAI3738

Order Symphypleona

Family Dicyrtomidae

Dicyrtomina minuta Fabricius, 1783

Family Katiannidae

Sminthurinus elegans Fitch, 1862

Notes: BOLD:AAB3495|BOLD:AAB3496

Brachyiulus pusillus Leach, 1815

Notes: BOLD:AAM7944

Family Julidae

Cylindroiulus caeruleocinctus Wood, 1864

Notes: BOLD:AAH7472

Julus scandinavius Latzel, 1884

Notes: BOLD:AAH7469

Ophyiulus pilosus Newport, 1843

Class Insecta

Order Coleoptera

Family Anobiidae

Caenocara sp.

Ptilinus ruficornis Say, 1823

Family Anthicidae

Malporus formicarius LaFerté-Sénectère, 1849

Notes: BOLD:ACF8552

Notoxus desertus Casey, 1895

Notes: BOLD:ABX0657

Stricticomus tobias Marseul, 1879

Notes: BOLD:AAQ1028

Family Anthribidae

Anthribus nebulosus Forster, 1770

Notes: BOLD:AAO1339

Ormiscus walshii LeConte, 1876

Notes: BOLD:AAU7341

Family Buprestidae

Agrilus sulciollis **Lacordaire, 1835**

Family Byrrhidae

Simplocaria semistriata **Fabricius, 1801**

Notes: BOLD:ABW1696

Family Byturidae

Byturus unicolor **Say, 1823**

Family Cantharidae

Cantharis rufa **Linnaeus, 1758**

Chauliognathus pensylvanicus **DeGeer, 1774**

Rhagonycha fulva **Scopoli, 1763**

Rhaxonycha carolina **Fabricius, 1801**

Family Carabidae

Agonoleptus conjunctus **Say, 1823**

Notes: BOLD:AAE9008

Agonum fidele **Casey, 1920**

Agonum gratiosum **Mannerheim, 1853**

Amara angustata **Say, 1823**

Amara rubrica **Haldeman, 1843**

Notes: BOLD:AAM7658

Bembidion frontale **LeConte, 1847**

Notes: BOLD:AAU7150

Bembidion obtusum **Audinet-Serville, 1821**

Notes: BOLD:AAP9490

Calleida punctata **LeConte, 1846**

Carabus granulatus **Linnaeus, 1758**

Carabus nemoralis **Müller, 1764**

Chlaenius tricolor **Dejean, 1826**

Clivina fossor **Linnaeus, 1758**

Notes: BOLD:AAH0274

Colliuris pensylvanica **Linnaeus, 1758**

Dyschirius setosus **LeConte, 1857**

Elaphrus clairvillei **Kirby, 1837**

Lebia fuscata **Dejean, 1825**

Notes: BOLD:AAH0212

Lebia solea Hentz, 1830

Lebia viridis Say, 1823

Notes: BOLD:AAH0141

Platynus hypolithos Say, 1823

Pterostichus melanarius Illiger, 1798

Family Cerambycidae

Acalymma vittata Barber, 1947

Astylopsis macula Say, 1826

Astylopsis sexguttata Say, 1826

Bellamira scalaris Say, 1826

Calligrapha californica subsp. *coreopsivora* Brown

Chaetocnema sp.

Charidotella sexpunctata subsp. *bicolor* Fabricius, 1798

Chrysochus auratus Fabricius, 1775

Chrysolina hudsonica Brown, 1938

Cicindela punctulata subsp. *punctulata* Olivier

Cicindela sexguttata Fabricius, 1775

Clytus ruricola Olivier, 1795

Crepidodera sp.

Cyrtophorus verrucosus Olivier, 1795

Notes: BOLD:AAD4513

Deloyala guttata Olivier, 1790

Dibolia sp.

Epitrix sp.

Euderces picipes Fabricius, 1787

Gaurotes cyanipennis Say, 1824

Notes: BOLD:AAI7042

Longitarsus sp.

Mantura floridana Crotch, 1873

Megacyllene robiniae Forster, 1771

Molorchus bimaculatus Say, 1824

Notes: BOLD:AAH0019

Neoclytus acuminatus **subsp. *acuminatus* Fabricius**

Oberea tripunctata **Swederus, 1787**

Obrium rufulum **Gahan, 1908**

Oulema palustris **Blatchley, 1913**

Paria **sp.**

Phyllotreta **sp.**

Phymatodes amoenus **Say, 1824**

Plagiodera versicolor **Laicharting, 1781**

Psylliodes punctulata **Melsheimer, 1847**

Pyrrhalta **sp.**

Systena blanda **F. E. Melsheimer, 1847**

Tetraopes tetrophthalmus **Forster, 1771**

Tetrops praeusta **Linnaeus, 1758**

Notes: BOLD:AAE9431

Trigonarthris proxima **Say, 1824**

Trirhabda **sp.**

Typocerus velutinus **subsp. *velutinus* Olivier**

Urgleptes querci **Fitch, 1858**

Xylotrechus convergens **LeConte, 1873**

Xylotrechus gemellus **Casey, 1893**

Zeugophora varians **Crotch, 1873**

Family Cerylonidae

Philothermus glabriculus **LeConte, 1863**

Notes: BOLD:ABX9329

Family Chrysomelidae

Altica chalybea **Illiger, 1807**

Altica **sp.**

Cassida rubiginosa **Müller, 1776**

Notes: BOLD:AAO0522

Crepidodera heikertingeri **Lazorko, 1974**

Notes: BOLD:AAG4462

Dibolia borealis **Chevrolat in Guérin-Méneville, 1834**

Notes: BOLD:AAL0908

Epitrix cucumeris **Harris, 1851**

Notes: BOLD:ABA9101

Exema canadensis Pierce, 1940

Helocassis clavata Fabricius, 1798

Microrhopala vittata Fabricius, 1798

Neogalerucella calmariensis Linnaeus, 1767

Notes: BOLD:AAL2945

Ophraella conferta J. L. LeConte, 1865

Notes: BOLD:ACF8270

Paria fragariae Wilcox, 1954

Notes: BOLD:ABA3960|BOLD:ACF6671

Phyllotreta striolata Fabricius, 1801

Notes: BOLD:AAL5267

Plagiodera versicolora Laicharting, 1781

Psylliodes affinis Paykull, 1799

Notes: BOLD:AAU6967

Psylliodes napi Fabricius, 1792

Psylliodes picinus Marsham, 1802

Pyrrhalta viburni Paykull, 1799

Trirhabda borealis Blake, 1931

Notes: BOLD:AAG4458

Xanthonia decemnotata Say, 1824

Notes: BOLD:ABA6335|BOLD:ACJ0239

Family Ciidae

Ceracis thoracicornis Ziegler, 1845

Family Cleridae

Cymatodera bicolor Say, 1825

Notes: BOLD:AAU6910

Enoclerus nigripes Say, 1823

Notes: BOLD:AAU6970

Enoclerus rosmarus Say, 1823

Isohydnocera curtipennis Newman

Phyllobaenus verticalis Say, 1835

Placopterus thoracicus Olivier, 1795

Notes: BOLD:AAP8584

Zenodosus sanguineus **Say, 1835**
Notes: BOLD:ABA6311

Family Coccinellidae

Coccinella septempunctata **Linnaeus, 1758**

Coleomegilla maculata **De Geer, 1775**
Notes: BOLD:AAD7604

Coleomegilla maculata **subsp.** ***lengi*** **Timberlake**

Didion punctatum **Melsheimer, 1847**

Harmonia axyridis **Pallas, 1773**
Notes: BOLD:AAB5640

Hippodamia glacialis **Fabricius, 1775**
Notes: BOLD:AAH3305

Hippodamia variegata **Goeze, 1777**

Hyperaspis binotata **Say, 1826**

Hyperaspis cf. binotata

Propylaea quatuordecimpunctata **Linnaeus, 1758**
Notes: BOLD:AAF6935

Propylea quatuordecimpunctata **Linnaeus, 1758**

Psyllobora vigintimaculata **subsp.** ***maculata*** **Say**

Scymnus **sp.**

Stethorus punctillum **Weise, 1891**
Notes: BOLD:AAN6149

Family Corylophidae

Orthoperus scutellaris **LeConte, 1878**
Notes: BOLD:AAU7040

Sericoderus lateralis **Gyllenhal, 1827**
Notes: BOLD:ABA2914

Family Cryptophagidae

Atomaria ephippiata **Zimmermann, 1869**

Family Curculionidae

Acoptus suturalis **LeConte, 1876**
Notes: BOLD:AAU6930

Barypeithes pellucidus **Boheman, 1834**
Notes: BOLD:AAG5192

Hylesinus aculeatus **Say, 1824**
Notes: BOLD:AAU7331

Hypera zoilus **Scopoli, 1763**

Isochnus sequensi **Stierlin 1894**
Notes: BOLD:ACA3052

Madarellus undulatus **Say, 1824**
Notes: BOLD:AAY6533

Monarthrum mali **Fitch, 1855**
Notes: BOLD:ACD0202

Orchestes alni **Linnaeus 1758**
Notes: BOLD:AAM7726

Phyllobius oblongus **Linnaeus, 1758**
Notes: BOLD:AAF9187

Pityogenes hopkinsi **Swaine, 1915**
Notes: BOLD:ABW5076

Polydrusus impressifrons **Gyllenhal, 1834**
Notes: BOLD:AAO4332

Sitona lineellus **Bonsdorff, 1785**

Tychius meliloti **Stephens, 1831**
Notes: BOLD:AAM7740

Xyleborinus alni **Niijima 1909**
Notes: BOLD:AAB2754

Xyleborinus saxeseni **Ratzeburg, 1837**
Notes: BOLD:AAB9578

Xyleborus dispar **Fabricius, 1792**
Notes: BOLD:AAD0158

Xylosandrus germanus **Blandford, 1894**
Notes: BOLD:AAF7523

Family Dytiscidae

Desmopachria convexa **Aubé, 1838**

Family Elateridae

Aeolus mellillus **Say, 1836**

Ampedus areolatus **Say, 1823**
Notes: BOLD:ACM2015

Ampedus linteus **Say, 1839**
Notes: BOLD:AAU7141

Ampedus nigricollis **Herbst, 1801**
Notes: BOLD:AAH2376

Ampedus oblessus **Say, 1833**
Notes: BOLD:ACA3849

Ampedus protervus **LeConte, 1853**
Notes: BOLD:ACR3975

Athous brightwelli **Kirby, 1837**

Corymbitodes tarsalis **Melsheimer, 1844**
Notes: BOLD:ACV5201

Ctenicera cylindriformis **Herbst, 1806**
Notes: BOLD:AAH2370

Dalopius vagus **Brown, 1934**

Hemicrepidius memnonius **Herbst, 1806**

Melanotus castanipes **Paykull, 1800**
Notes: BOLD:AAH2378

Family Endomychidae

Mycetina perpulchra **Newman, 1838**

Phymaphora pulchella **Newman, 1838**
Notes: BOLD:ACI7114

Family Erotylidae

Triplax flavicollis **Lacordaire, 1842**

Triplax thoracica **Say, 1825**

Tritoma pulchra **Say, 1826**

Tritoma sanguinipennis **Say, 1825**

Family Eucnemidae

Dirrhagofarsus lewisi **Fleutiaux, 1900**

Hylis terminalis **LeConte, 1866**

Isorhipis obliqua **Say, 1836**

Microrhagus **sp.**

Microrhagus subsinuata **LeConte**

Microrhagus triangularis **Say, 1823**

Family Gyrinidae

Dineutus assimilis **Kirby, 1937**

Family Haliplidae

Haliplus immaculicollis **Harris, 1828**

Family Hydrophilidae

Anacaena lutescens **Stephens, 1829**

Cercyon haemorrhoidalis **Fabricius, 1775**

Notes: BOLD:ABV1545

Enochrus ochraceus **Melsheimer, 1844**

Tropisternus natator **Orchymont, 1938**

Family Kateretidae

Brachypterolus pulicarius **Linnaeus, 1758**

Family Lampyridae

Ellychnia corrusca **Linnaeus, 1767**

Notes: BOLD:ACV4844

Lucidota atra **G. Olivier, 1790**

Photinus **sp.**

Pyractomena **sp.**

Pyropyga nigricans **Say, 1823**

Family Languriidae

Acropteroxys gracilis **Newman 1838**

Family Latridiidae

Cortinicara gibbosa **Herbst, 1793**

Notes: BOLD:AAI8935

Family Leiodidae

Anisotoma obsoleta **Horn, 1880**

Notes: BOLD:AAR3435

Anisotoma **sp.**

Catops paramericanus **Peck and Cook, 2002**

Notes: BOLD:AAH3504

***Catops* sp.**

***Lionothus* sp.**

***Nemadus* sp.**

***Prionochaeta opaca* Say, 1825**

Notes: BOLD:AAP6949

***Ptomophagus* sp.**

***Sciodrepoides fumatus* subsp. *terminans* LeConte**

Family Melandryidae

***Dircaea liturata* LeConte, 1866**

***Epicauta pensylvanica* De Geer, 1775**

***Melandrya striata* Say, 1824**

Notes: BOLD:AAK7242

Family Meloidae

***Epicauta murina* LeConte, 1853**

***Meloe impressus* Kirby, 1837**

Family Melyridae

***Collops quadrimaculata* Fabricius, 1798**

***Hypebaeus apicalis* Say, 1825**

Notes: BOLD:AAN5932

Family Mordellidae

***Mordellina infima* LeConte, 1862**

***Mordellistena andreae* LeConte, 1862**

***Mordellistena bifasciata* Ray, 1936**

***Mordellistena cervicalis* LeConte, 1862**

Mordellistena cf. lutea

***Mordellistena ornata* Melsheimer, 1845**

***Mordellistena picilabris* Helmuth, 1864**

***Mordellistena* sp.**

***Mordellochroa scapularis* Say, 1824**

Notes: BOLD:AAU6912

Paramordellaria triloba Say, 1824

Tomoxia lineela LeConte

Family Mycetophagidae

Mycetophagus pluripunctatus LeConte, 1856

Family Nitidulidae

Carpophilus sayi Parsons, 1943

Conotelus obscurus Erichson, 1843

Glischrochilus fasciatus Olivier, 1790

Glischrochilus quadrisiginatus Say 1835

Glischrochilus sanguinolentus subsp. *sanguinolentus* Olivier, 1790

Omosita colon Linnaeus, 1758

Stelidota octomaculata Say, 1825

Notes: BOLD:AAH0115

Family Pedilidae

Pedilus lugubris Say

Family Phalacridae

Acylomus pugetanus Casey, 1916

Notes: BOLD:AAH0135

Olibrus semistriatus LeConte, 1856

Stilbus apicialis Melsheimer, 1844

Notes: BOLD:AAH0134

Family Psephenidae

Psephenus herricki DeKay, 1844

Family Ptilodactylidae

Ptilodactyla sp.

Family Ptinidae

Hadrobregmus notatus Say, 1825

Notes: BOLD:AAP8586

Family Pyrochroidae

Dendroides canadensis Leconte

Schizotus cervicalis Newman, 1838

Family Rhipiphoridae

Pelecotoma flavipes Melsheimer, 1846

Ripiphorus fasciatus Say, 1824

Family Scarabaeidae

Amphimallon majale Razumowski, 1789

Aphodius granarius Linnaeus, 1767

Ataenius strigatus Say, 1823

Calamosternus granarius Linnaeus, 1767

Notes: BOLD:AAM7733

Onthophagus orpheus subsp. *canadensis* Fabricius, 1801

Osmoderma scabra Palisot de Beauvois, 1805

Phyllophaga futilis LeConte, 1850

Notes: BOLD:AAD1098

Phyllophaga rugosa Melsheimer, 1845

Notes: BOLD:AAJ2312

Popillia japonica Newman, 1841

Rhyssemus germanus Linnaeus, 1767

Trox scabrosus Beauvois, 1805

Family Scirtidae

Cyphon laevipennis Tournier, 1868

Notes: BOLD:AAG3633

Cyphon obscurus Guerin and Memeville, 1834

Notes: BOLD:AAG7259

Cyphon pusillus LeConte

Notes: BOLD:AAP7021

Scirtes tibialis Guerin

Family Scolytidae

Hylurgopinus rufipes Eichhoff, 1868

Scolytus mali Bechstein, 1805

Xyleborus sayi Hopkins, 1915

Family Scraptiidae

Anaspis rufa Say, 1826

Notes: BOLD:AAH0469

Canifa pallipes Melsheimer, 1846

Family Silphidae

Necrophila americana Linnaeus, 1758

Nicrophorus orbicollis Say, 1825

Notes: BOLD:AAE1939

Oiceoptoma inaequale Fabricius, 1781

Family Silvanidae

Ahasverus advena Waltl, 1834

Notes: BOLD:AAJ2005

Silvanus bidentatus Fabricius, 1792

Notes: BOLD:AAO0157

Telephanus velox Haldeman, 1846

Notes: BOLD:AAW6380

Family Staphylinidae

Amischa analis Gravenhorst, 1802

Notes: BOLD:ABA5313

Anotylus insecatus Gravenhorst, 1806

Notes: BOLD:AAR3352

Anotylus tetracarinatus Block, 1799

Atheta brunneipennis Thomson, 1852

Notes: BOLD:ABA9094

Bisnius blandus Gravenhorst, 1806

Carpelimus fuliginosus Gravenhorst, 1802

Notes: BOLD:AAO0558

Coproporus ventriculus Say, 1834

Notes: BOLD:ACV1788

Lordithon appalachianus **Campbell, 1982**
Notes: BOLD:ABA6331

Lordithon cinctus **Gravenhorst, 1802**
Notes: BOLD:ABA6370

Meronera venustula **Erichson, 1839**
Notes: BOLD:ABW2870

Myllaena arcana **Casey, 1911**
Notes: BOLD:ACJ6804

Philonthus caeruleipennis **Mannerheim, 1830**

Philonthus flavibasis **Casey, 1915**
Notes: BOLD:AAH0113

Platydracus cinnamopterus **Gravenhorst, 1802**
Notes: BOLD:ACJ0017

Scaphidium quadriguttatum **Melsheimer**
Notes: BOLD:ACP0011

Sepedophilus cinctulus **Erichson, 1839**
Notes: BOLD:ACC1294

Sepedophilus testaceus **Fabricius, 1793**
Notes: BOLD:AAH0108

Stenichnus scutellaris **Muller & Kunze, 1822**
Notes: BOLD:AAN9916

Tachinus corticinus **Gravenhorst, 1802**
Notes: BOLD:AAH0107

Tachyporus atriceps **Stephens, 1832**
Notes: BOLD:ABX2484

Tachyporus chrysomelinus **Linnaeus, 1758**
Notes: BOLD:AAN9511

Tachyporus elegans **Horn, 1877**
Notes: BOLD:AAU6934

Tachyporus nitidulus **Fabricius, 1781**
Notes: BOLD:ABA9096

Trichophya pilicornis **Gyllenhal, 1810**
Notes: BOLD:ABW9580

Xantholinus linearis Olivier, 1795

Notes: BOLD:AAG4333

Family Stenotrachelidae

Cephaloon lepturoides Newman, 1838

Family Synchroidae

Mallodrya subaenea Horn, 1888

Notes: BOLD:AAK7440

Synchroa punctata Newman, 1838

Family Tetratomidae

Eustrophus tomentosus Say, 1827

Notes: BOLD:ACI7017

Family Throscidae

Aulonothroscus constrictor Say, 1839

Notes: BOLD:AAU7339

Aulonothroscus distans Blanchard, 1917

Notes: BOLD:ABA9083

Aulonothroscus sp.

Trixagus carinicollis Schaeffer, 1916

Notes: BOLD:AAN6148

Trixagus chevrolati Bonvouloir, 1859

Family Trogossitidae

Tenebroides corticalis Melsheimer, 1844

Order Dermaptera

Family Forficulidae

Forficula auricularia Linnaeus, 1758

Forficula auricularia-A Linnaeus, 1758

Notes: BOLD:AAG9897

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The second of five checklists for Kingdom Animalia, this checklist contains members of Phylum Arthopoda, Class Insecta (Orders Diptera, Ephemeroptera, and Hemiptera).

Phylum Arthropoda

Kingdom Animalia

Class Insecta

Order Diptera

Family Agromyzidae

Agromyza frontella Rondani, 1874
Notes: BOLD:AAJ7105

Aulagromyza luteoscutellata de Meijere, 1924
Notes: BOLD:AAJ9681

Calycomyza majuscula Frick, 1956
Notes: BOLD:AAV4861

Cerodontha biseta Hendel, 1920

Cerodontha dorsalis Loew, 1863

Cerodontha fasciata Strobl, 1880

Cerodontha muscina Meigen, 1830
Notes: BOLD:AAF1051

Chromatomyia lactuca Frost, 1924

Japanagromyza viridula Coquillett, 1902
Notes: BOLD:AAI7960

Liriomyza brassicae Riley, 1885
Notes: BOLD:AAF6806

Liriomyza fricki Spencer, 1965
Notes: BOLD:ACE7414

Nemorimyza posticata Meigen, 1830
Notes: BOLD:AAG9234|BOLD:ACJ0616

Ophiomyia labiatarum Hering, 1937

Ophiomyia nasuta Melander, 1913

Notes: BOLD:AAK5607

Ophiomyia quinta Spencer, 1969

Notes: BOLD:AAI3360|BOLD:ABZ1036

Ophiomyia similata Malloch, 1918

Notes: BOLD:AAP8823|BOLD:ACV3095|BOLD:ACV5944

Phytoliriomyza dorsata Siebke, 1864

Notes: BOLD:AAG4751

Phytoliriomyza robiniae Valley, 1982

Notes: BOLD:AAY1337

Phytomyza flavicornis Fallen, 1823

Notes: BOLD:AAH9376

Phytomyza solidaginophaga Sehgal, 1971

Notes: BOLD:AAL4176

Pseudonapomyza europaea Spencer, 1973

Family Anisopodidae

Sylvicola alternatus Say, 1823

Notes: BOLD:AAG2000

Sylvicola fuscatus Fabricius, 1775

Notes: BOLD:AAG1998

Family Anthomyiidae

Anthomyia pluvialis Linnaeus, 1758

Notes: BOLD:AAP2970

Delia antiqua Meigen, 1826

Delia platura Meigen, 1826

Notes: BOLD:AAA3453

Eustalomyia festiva Zetterstedt, 1845

Notes: BOLD:AAP8833

Eutrichota pilimana Ringdahl, 1918

Notes: BOLD:AAP2968

Hylemyza partita Meigen, 1826

Notes: BOLD:AAG2463

Pegomya flavifrons **Walker, 1849**

Notes: BOLD:AAG2479

Family Anthomyzidae

Mumetopia occipitalis **Melander, 1913**

Notes: BOLD:AAG4827

Stiphrosoma balteatum **Rohacek & Barber, 2005**

Family Asilidae

Dioctria baumhaueri **Meigen, 1820**

Efferia aestuans **Linnaeus, 1763**

Efferia albibarbis **Macquart, 1838**

Laphria canis **Williston, 1883**

Laphria canis complex **Williston, 1883**

Laphria cinerea **Back, 1904**

Laphria flavicollis **Say, 1824**

Laphria janus **McAtee, 1919**

Laphria sicula **McAtee, 1919**

Laphria thoracica **Fabricius, 1805**

Machimus sadyates **Walker, 1849**

Family Aulacigastridae

Aulacigaster neoleucopeza **Mathis & Freidberg, 1994**

Notes: BOLD:AAV0437|BOLD:ABV3853

Family Bombyliidae

Anthrax irroratus **Say, 1823**

Bombylius major **Linnaeus, 1758**

Notes: BOLD:ABV0388

Hemipenthes morio **Linnaeus, 1758**

Hemipenthes sinuosa **Wiedemann, 1821**

Hemipenthes webberi **Johnson, 1919**

Xenox tigrinus **De Geer, 1776**

Family Calliphoridae

Calliphora livida **Hall, 1948**

Notes: BOLD:ABY7153

Cynomya cadaverina **Robineau-Desvoidy, 1830**

Notes: BOLD:AAB0868

Phormia regina Meigen, 1826
Notes: BOLD:AAB9140

Pollenia angustigena Wainwright, 1940
Notes: BOLD:AAP2825

Pollenia griseotomentosa Jacentkovsky, 1944
Notes: BOLD:AAI2766

Pollenia labialis Robineau-Desvoidy, 1863
Notes: BOLD:AAI2765

Pollenia pediculata Macquart, 1834
Notes: BOLD:AAG6745

Pollenia rudis Fabricius, 1794
Notes: BOLD:AAH3035

Family Cecidomyiidae

Asteromyia carbonifera Osten Sacken, 1862
Notes: BOLD:AAA2254|BOLD:ABX5689

Asteromyia laeviana Felt, 1907
Notes: BOLD:ABV1420

Asteromyia modesta Felt, 1907
Notes: BOLD:AAM1947|BOLD:AAM1948|BOLD:AAM1954|BOLD:ACG8775|BOLD:ACN2213

Asteromyia tumifica Beutenmuller, 1907
Notes: BOLD:ACL0470

Janetiella glechomae Tavares, 1930
Notes: BOLD:AAQ0642

Mayetiola destructor Say, 1817
Notes: BOLD:ABV9277

Family Ceratopogonidae

Stilobezzia antennalis Coquillett, 1901

Family Chironomidae

Bryophaenocladius ictericus Meigen, 1830
Notes: BOLD:AAM6273

Bryophaenocladius sp. 8ES
Notes: BOLD:AAG1021

Camptocladius stercorarius **De Geer, 1776**
Notes: BOLD:AAN5341

Chironomus acidophilus **Keyl, 1960**
Notes: BOLD:AAJ4295

Chironomus dilutus **Kiknadze & Butler, 1999**
Notes: BOLD:AAB4658

Chironomus maturus **Johannsen, 1908**
Notes: BOLD:AAB4657

Chironomus melanescens **Keyl, 1961**
Notes: BOLD:AAI4303

Chironomus ochreatus **Townes, 1945**
Notes: BOLD:ACV5571

Cladotanytarsus atridorsum **Kieffer, 1924**
Notes: BOLD:AAJ3263

Conchapelopia telema **Roback, 1971**
Notes: BOLD:AAC4802|BOLD:AAN5351

Corynoneura scutellata **Winnertz, 1846**
Notes: BOLD:AAN5330

Cricotopus annulator cmplx **Goetghebuer, 1927**

Cricotopus bicinctus **Meigen, 1818**
Notes: BOLD:ACC7282

Cricotopus sp. 18ES

Cricotopus sp. 19ES
Notes: BOLD:AAP5141

Cricotopus tremulus **Linnaeus, 1758**
Notes: BOLD:AAE4298

Cricotopus triannulatus **Macquart, 1826**
Notes: BOLD:AAP5920

Cricotopus trifascia **Edwards, 1929**
Notes: BOLD:ACS9429|BOLD:ACT0257

Cricotopus vierriensis **Goetghebuer, 1935**
Notes: BOLD:AAG1005|BOLD:ACV5403|BOLD:ACV5404

Dicrotendipes modestus Say, 1823
Notes: BOLD:AAL7329

Dicrotendipes tritomus Kieffer, 1916
Notes: BOLD:AAC0706

Gymnometriocnemus brumalis Edwards, 1929
Notes: BOLD:AAP6873

Lauterborniella agrayloides Kieffer, 1911
Notes: BOLD:AAN5343

Limnophyes natalensis Kieffer, 1914
Notes: BOLD:AAB7361

Limnophyes sp. 14ES
Notes: BOLD:ABU5525

Metriocnemus sp. 4ES
Notes: BOLD:ABX5809

Micropsectra nigripila Johannsen, 1905

Micropsectra subletteorum Anderson, Stur & Ekrem, 2013
Notes: BOLD:AAF7088

Microtendipes pedellus De Geer, 1776
Notes: BOLD:AAE0707

Monopelopia tenuicalcar Kieffer, 1918
Notes: BOLD:AAM6277

Nanocladius anderseni Saether, 1977
Notes: BOLD:AAC3041

Nilotanypus fimbriatus Walker, 1828
Notes: BOLD:AAE5762

Orthocladius carlatus Roback, 1957
Notes: BOLD:AAG1000

Orthocladius dorenus Roback, 1957
Notes: BOLD:AAB2641|BOLD:AAB2645|BOLD:ACV3368

Orthocladius oliveri Soponis, 1977
Notes: BOLD:AAB7872

Orthocladius rivulorum Kieffer, 1909
Notes: BOLD:AAB3988

Pagastia orthogonia **Oliver, 1959**
Notes: BOLD:AAI2601

Paraphaenocladius impensus **Walker, 1856**
Notes: BOLD:AAC4197

Paratanytarsus dissimilis **Johannsen, 1905**
Notes: BOLD:AAE3698

Paratanytarsus grimmii **Schneider, 1885**
Notes: BOLD:AAD1485

Paratanytarsus laccophilus **Edwards, 1929**
Notes: BOLD:AAC8842|BOLD:ACF2457

Paratanytarsus sp. 7TE
Notes: BOLD:AAP2907

Paratanytarsus sp. TE03
Notes: BOLD:AAE3675

Polypedilum convictum **Walker, 1856**
Notes: BOLD:AAD1397

Psectrocladius obvius **Walker, 1856**
Notes: BOLD:AAF6432

Rheocricotopus robacki **Beck and Beck, 1964**
Notes: BOLD:AAM6249

Rheotanytarsus pellucidus **Walker, 1848**
Notes: BOLD:AAI0332

Smittia edwardsi **Goetghebuer, 1932**
Notes: BOLD:AAF4817

Smittia sp. 14ES
Notes: BOLD:AAM7064

Smittia sp. 22ES
Notes: BOLD:AAN5358

Smittia sp. 23ES
Notes: BOLD:AAH9641

Smittia sp. 8ES
Notes: BOLD:ACP4736

Stempellinella fimbriata Ekrem, 2007
Notes: BOLD:AAD0300

Tanytarsus glabrescens Edwards, 1929
Notes: BOLD:ACV5604|BOLD:ACV5898

Tanytarsus guerlus Roback, 1957
Notes: BOLD:AAC4523|BOLD:AAC4525

Tanytarsus mendax Kieffer, 1925
Notes: BOLD:ACJ3722|BOLD:ACV3832

Tanytarsus recurvatus Brundin, 1947
Notes: BOLD:AAC3354

Tanytarsus wirthi Ekrem, Sublette & Sublette, 2003
Notes: BOLD:AAD2144

Thienemanniella xena Roback, 1957
Notes: BOLD:AAD5253|BOLD:AAD5254

Family Chloropidae

Chaetochlorops inquilinus Coquillett, 1898

Elachiptera costata Loew, 1863

Elachiptera nigriceps Loew, 1863
Notes: BOLD:AAP5169

Elachiptera sibirica Loew, 1858
Notes: BOLD:AAH4208

Eribolus longulus Loew, 1863

Gaurax dubius Macquart, 1835
Notes: BOLD:ACC7744

Gaurax pallidipes Malloch, 1915
Notes: BOLD:AAH4210

Gaurax varihalteratus Malloch, 1913
Notes: BOLD:ACM2340

Hapleginella conicola Greene, 1918

Malloewia abdominalis Becker, 1912
Notes: BOLD:ABW1379

Malloewia nigripalpis Malloch, 1913
Notes: BOLD:ABZ4644

Olcella provocans Becker, 1912

Oscinella frit Linnaeus, 1758

Oscinisoma alienum Becker, 1912

Notes: BOLD:ACE3223

Psilacrum arpidia Malloch, 1916

Notes: BOLD:ACE0829

Rhopalopterum carbonarium Loew, 1869

Thaumatomyia glabra Meigen, 1830

Notes: BOLD:AAH4135

Family Chyromyidae

Gymnochiromyia concolor Malloch, 1914

Notes: BOLD:ACV5890

Family Clusiidae

Clusia czernyi Johnson, 1913

Notes: BOLD:AAF4394

Clusia lateralis Walker, 1849

Clusiodes johnsoni Malloch, 1922

Notes: BOLD:AAJ4032

Clusiodes melanostomus Loew, 1864

Notes: BOLD:AAJ4031

Sobarocephala flaviseta Johnson, 1913

Notes: BOLD:AAN5648

Sobarocephala setipes Melander and Argo, 1924

Family Conopidae

Physocephala marginata Say, 1823

Family Culicidae

Aedes canadensis Theobald

Aedes cinereus Meigen, 1818

Notes: BOLD:AAC1222

Aedes sp.

Aedes stimulans (Walker, 1848)

Aedes vexans Meigen, 1830

Notes: BOLD:AAA7067

Anopheles quadrimaculatus Say, 1824

Coquillettidia perturbans Walker, 1856

Notes: BOLD:AAB2539

Culex restuans Theobald, 1901

Notes: BOLD:AAA7661

Culex territans Walker, 1856

Notes: BOLD:AAB6943|BOLD:ABY7666

Mansonia perturbans Walker

Family Dolichopodidae

Dolichopus orichalceus Gosseries, 1989

Dolichopus terminalis Loew, 1866

Gymnopternus celer Meigen, 1824

Medetera signaticornis Loew, 1857

Notes: BOLD:AAZ3931

Neurigona disjuncta Van Duzee, 1913

Notes: BOLD:ABW1193

Xanthochlorus helvinus Loew, 1861

Family Drosophilidae

Chymomyza amoena Loew, 1862

Notes: BOLD:AAE2703

Drosophila affinis Sturtevant, 1916

Notes: BOLD:AAB8851

Drosophila falleni Wheeler, 1960

Notes: BOLD:AAB7507

Leucophenga varia Walker, 1849

Notes: BOLD:AAG8500

Scaptomyza adusta Loew, 1862

Notes: BOLD:AAG8491

Family Empididae

Rhamphomyia versicolor Chillcott, 1959

Notes: BOLD:AAM7337

Family Ephydridae

Athyroglossa dinorata Mathis & Zatwarnicki, 1990

Athyroglossa granulosa Cresson, 1922

Notes: BOLD:ABY0801

Axysta extera Cresson, 1942

Coenia curvicauda Meigen, 1830

Discocerina obscurella Fallen, 1813

Discomyza incurva Fallen 1823

Notes: BOLD:ABA8754

Hyadina albovenosa Coquillett, 1900

Hydrellia albilabris Meigen, 1830

Hydrellia griseola Fallen, 1813

Hydrellia ischiaca Loew, 1862

Hydrellia notata Deonier, 1971

Nostima scutellaris Cresson, 1933

Ochthera anatolikos Clausen, 1977

Parydra aquila Fallen, 1813

Philygria debilis Loew, 1861

Philygria obtecta Becker, 1896

Notes: BOLD:AAG2740

Pseudohyadina longicornis Sturtevant and Wheeler, 1954

Scatella favillacea Loew, 1862

Scatella stagnalis Fallen, 1813

Scatella tenuicosta Collin, 1930

Scatophila despecta Haliday, 1839

Scatophila virildella Sturtevant & Wheeler, 1954

Family Fanniidae

Fannia armata Meigen, 1826

Notes: BOLD:AAU6630

Family Heleomyzidae

Suillia quinquepunctata Say, 1823

Notes: BOLD:AAC8595

Family Hybotidae

Leptopeza flavipes Meigen, 1820

Notes: BOLD:ACE5974

Platypalpus annulatus Fallen, 1815

Platypalpus holosericus Melander, 1924

Notes: BOLD:AAP6357

Platypalpus melleus Melander, 1927

Notes: BOLD:AAV3697

Platypalpus niger Meigen, 1804

Platypalpus pulicarius Meigen, 1830

Notes: BOLD:AAQ0265

Platypalpus stabilis Collin, 1961

Platypalpus unguiculatus Zetterstedt, 1838

Notes: BOLD:ABA0579

Tachydromia aemula Loew, 1864

Notes: BOLD:AAN5500

Family Keroplatidae

Orfelia nemoralis Meigen, 1818

Notes: BOLD:AAP2528

Family Lauxaniidae

Lauxania shewelli Perusse & Wheeler 2000

Poecilominettia puncticeps Coquillett, 1902

Notes: BOLD:AAN8633

Family Limoniidae

Epiphragma fasciapenne Say, 1823

Notes: BOLD:ACL8650

Erioptera caliptera Say, 1823

Notes: BOLD:AAN5882

Erioptera ebenina Alexander, 1926

Notes: BOLD:ACB0353

Helius flavipes Macq.

Notes: BOLD:AAF9008

Ilisia venusta Osten Sacken, 1860

Ormosia affinis Lundbeck, 1898

Notes: BOLD:AAU6544

Ormosia meigenii Osten Sacken, 1859

Notes: BOLD:ACA9818

Pseudolimnophila inornata Osten Sacken, 1869
Notes: BOLD:AAI1351

Family Lonchopteridae

Lonchoptera bifurcata Fallen, 1810

Family Micropezidae

Compsobata univitta Walker, 1849
Notes: BOLD:AAP8989

Rainieria antennaepes Say, 1823

Family Milichiidae

Leptometopa latipes Meigen, 1830
Notes: BOLD:AAP8985

Paramyia nitens Loew, 1869
Notes: BOLD:AAG0166|BOLD:AAG0169

Pholeomyia indecora Loew, 1869

Family Muscidae

Coenosia tigrina Fabricius, 1775

Helina depuncta Fallen, 1825

Helina evecta Harris, 1780
Notes: BOLD:AAC2498

Helina rufitibia Stein, 1898
Notes: BOLD:AAG1742

Lispe albitarsis Stein, 1898
Notes: BOLD:AAP1125

Lispocephala erythrocera (Robineau-Desvoidy, 1830)

Macrorchis ausoba Walker, 1849

Muscina levida Harris, 1788
Notes: BOLD:AAB8817

Myospila meditabunda Fabricius, 1781
Notes: BOLD:AAD7145

Family Mycetophilidae

Aglaomyia gatineau Vockeroth, 1980
Notes: BOLD:ABV3010

Exechia attrita Johannsen, 1912
Notes: BOLD:ACM3454

Mycetophila caudata Staeger, 1840
Notes: BOLD:AAI3260

Mycetophila fungorum De Geer, 1776
Notes: BOLD:ACF2821

Mycetophila ocellus Walker, 1848
Notes: BOLD:AAP4734

Paratinia recurva Johannsen, 1910

Symmerus lautus Loew, 1869

Trichonta submaculata (Staeger, 1840)
Notes: BOLD:AAU4912

Zygomyia zaitzevi Chandler, 1991

Family Odiniidae

Odinia betulae Sabrosky, 1959
Notes: BOLD:AAP8071

Odinia meijerei Collin, 1952
Notes: BOLD:ACV3828

Family Opomyzidae

Geomyza apicalis (Meigen, 1830)
Notes: BOLD:ACM2703

Geomyza tripunctata Fallen, 1823

Family Pediciidae

Pedicia inconstans Osten Sacken, 1859

Family Phoridae

Conicera dauci Meigen, 1830
Notes: BOLD:AAN8685

Megaselia arcticae Disney, 2004
Notes: BOLD:AAG3248

Megaselia citrinella Buck & Disney, 2001

Megaselia fungivora Wood, 1909

Megaselia lucifrons (Schmitz, 1918)
Notes: BOLD:AAL9075

Megaselia nigriceps Loew, 1866
Notes: BOLD:AAY6384

Megaselia rufipes **Meigen, 1804**
Notes: BOLD:AAG3274

Megaselia variana **Schmitz, 1926**
Notes: BOLD:AAZ6701

Family Pipunculidae

Pipunculus hertzogi **Rapp, 1943**

Family Psilidae

Loxocera cylindrica **Say, 1823**

Psila lateralis **Loew, 1860**
Notes: BOLD:AAF9707

Psila persimilis **Wakerly, 1959**

Psila rosae **Fabricius, 1794**
Notes: BOLD:AAP6388

Family Psychodidae

Psychoda trinodulosa **Tonnoir, 1922**
Notes: BOLD:AAN8770

Family Rhagionidae

Bolbomyia nana **Loew, 1862**
Notes: BOLD:ACV5660

Chrysopilus thoracicus **Fabricius, 1805**

Rhagio tringarius **Linnaeus, 1758**

Family Sarcophagidae

Boettcheria bisetosa **Parker, 1914**
Notes: BOLD:AAH7139

Boettcheria cimbicis **Townsend, 1892**

Sarcophaga subvicina **Baranov, 1937**
Notes: BOLD:AAG6743

Senotainia trilineata **Wulp, 1890**
Notes: BOLD:AAG6744

Family Scathophagidae

Americina adusta **Loew, 1863**
Notes: BOLD:AAH4235

Megaphthalma pallida **Fallen, 1819**
Notes: BOLD:AAH4234

Parallelomma vittatum Meigen, 1826

Scathophaga furcata Say, 1823
Notes: BOLD:AAH0022

Family Sciaridae

Bradysia difformis Frey, 1948
Notes: BOLD:AAV1295

Bradysia fenestralis Zetterstedt, 1838
Notes: BOLD:AAV1366

Bradysia nitidicollis Meigen, 1818

Bradysia pallipes Fabricius, 1787
Notes: BOLD:AAM9254

Bradysia scabricornis Tuomikoski, 1960
Notes: BOLD:ABA0929

Bradysia vagans Winnertz, 1868
Notes: BOLD:AAM9252

Camptochaeta uniformis Mohrig & Menzel, 1990
Notes: BOLD:ACA4924

Corynoptera bicuspidata Lengersdorf, 1926
Notes: BOLD:AAU6513

Corynoptera cuniculata Lengersdorf, 1942
Notes: BOLD:AAU6537

Corynoptera melanochaeta Mohrig & Menzel, 1992
Notes: BOLD:AAM9242

Corynoptera saccata Tuomikoski, 1960
Notes: BOLD:AAN6437

Corynoptera subcavipes Menzel & Smith, 2007
Notes: BOLD:AAU6542

Cratyna ambigua Lengersdorf, 1934
Notes: BOLD:AAH3968|BOLD:AAN6439

Ctenosciara hyalipennis Meigen, 1804
Notes: BOLD:AAH3983

Leptosciarella scutellata Staeger, 1840
Notes: BOLD:ACD1218

Lycoriella castanescens Lengersdorf, 1940
Notes: BOLD:ABA1215

Lycoriella perochaeta Mohrig & Menzel, 1990
Notes: BOLD:ACC1855

Lycoriella stylata Mohrig & Mamaev, 1985
Notes: BOLD:AAN6430

Scatopsciara atomaria Zetterstedt, 1851
Notes: BOLD:AAN6431

Sciara humeralis Zetterstedt, 1851

Family Sciomyzidae

Poecilographa decorum Loew, 1864

Pteromicra similis Steyskal, 1954
Notes: BOLD:AAG6869

Tetanocera plumosa Loew, 1847

Trypetoptera canadensis Macquart, 1843

Family Sepsidae

Nemopoda nitidula Fallen, 1820
Notes: BOLD:AAG5640

Saltella sphondylii Schrank, 1803

Sepsis punctum Fabricius, 1794
Notes: BOLD:AAG5639

Family Simuliidae

Prosimulium arvum Adler and Kim, 1985
Notes: BOLD:AAD4764

Prosimulium mixtum Syme and Davies, 1958

Simulium vittatum Zetterstedt, 1838
Notes: BOLD:AAA4121

Family Sphaeroceridae

Apteromyia claviventris Strobl, 1909
Notes: BOLD:AAG7283

Coproica acutangula Zetterstedt, 1847

Coproica ferruginata Stenhammar, 1854
Notes: BOLD:AAN6407

Coproica hirtula Rondani, 1880
Notes: BOLD:ACF7714

Copromyza equina Fallen, 1820
Notes: BOLD:AAJ7412

Gonioneura spinipennis Haliday, 1836

Ischiolepta pusilla Fallen, 1820

Leptocera caenosa Rondani, 1880

Leptocera erythrocera Becker, 1919
Notes: BOLD:AAG7276

Lotophila atra Meigen, 1830

Minilimosina fungicola Spuler, 1925

Minilimosina intercepta Marshall, 1985
Notes: BOLD:AAG7309

Opalimosina mirabilis Collin, 1902

Pullimosina heteroneura Haliday, 1836

Pullimosina longicosta Spuler, 1925

Pullimosina pullula Zetterstedt, 1847

Rachispoda fumipennis-group Spuler 1924

Rachispoda limosa Fallén, 1820

Rachispoda lutosa-group Stenhammar, 1855

Sclerocoelus sordipes Adams 1904

Spelobia bifrons Stenhammar, 1854

Spelobia clunipes Meigen, 1830

Spelobia luteilabris Rondani, 1880

Spelobia ochripes Meigen, 1830
Notes: BOLD:AAG7279

Spelobia semioculata Richards, 1965

Sphaerocera curvipes Latreille, 1805

Telomerina flavipes Meigen, 1830
Notes: BOLD:ACJ1971

Trachyopella nuda Rohacek and Marshall, 1985

Family Stratiomyidae

Actina viridis Say, 1824
Notes: BOLD:AAP7640

Allognosta fuscitarsis Say, 1823

Allognosta obscuriventris Loew, 1863

Caloparyphus tetraspilus Loew, 1866

Euparyphus stigmaticalis Loew, 1866

Microchrysa polita Linnaeus, 1758

Nemotelus bruesii Melander, 1903

Nemotelus centralis Hanson, 1958

Psellidotus meganticus Curran, 1925

Ptecticus gigliotosi McFadden, 1971

Sargus decorus Say, 1824

Stratiomys norma Wiedemann, 1830

Stratiomys obesa Loew, 1866

Family Syrphidae

Allograpta micrura Osten Sacken, 1877

Allograpta obliqua Say, 1823

Notes: BOLD:AAD8276

Brachyopa sedmani

Brachypalpus oarus Walker, 1849

Notes: BOLD:AAP8757

Chalcosyrphus libo Walker, 1849

Notes: BOLD:AAG4679

Chalcosyrphus nemorum Fabricius, 1805

Notes: BOLD:AAG6762

Chrysotoxum pubescens Loew, 1864

Dasysyrphus venustus Meigen

Notes: BOLD:ACV5348

Epistrophe nitidicollis Meigen, 1822

Eristalis arbustorum Linnaeus, 1758

Eristalis dimidiata Wiedemann, 1830

Eristalis flavipes Walker, 1849

Eristalis stipator Osten Sacken, 1877

Eristalis tenax **Linnaeus, 1758**

Eristalis transversa **Wiedemann, 1830**

Eumerus **sp.**

Eupeodes americanus **Wiedemann, 1830**

Eupeodes volucris **Osten Sacken, 1877**

Ferdinandea buccata **Loew, 1863**

Notes: BOLD:AAE0948

Helophilus fasciatus **Walker, 1849**

Heringia salax **Loew, 1866**

Lejota aerea **Loew, 1872**

Notes: BOLD:AAY9807

Mallota posticata **Fabricius, 1805**

Melanotstoma mellinum **Linnaeus 1758**

Merodon equestris **Fabricius, 1794**

Microdon tristis **Loew, 1864**

Myolepta nigra **Loew, 1972**

Notes: BOLD:AAV0836

Neoascia distincta **Williston, 1887**

Notes: BOLD:AAG6766

Ocyptamus fuscipennis **Macquart, 1834**

Orthonevra nitida **Wiedemann, 1830**

Paragus haemorrhous **Meigen, 1822**

Notes: BOLD:AAC2439

Parhelophilus laetus **Loew, 1963**

Platycheirus hyperboreus **Staeger, 1845**

Notes: BOLD:ACF4734

Platycheirus obscurus **Say, 1824**

Notes: BOLD:AAF1237

Platycheirus quadratus **Say, 1823**

Platycheirus scambus **Staeger, 1843**

Sericomyia chrysotoxoides **Macquart, 1842**

Notes: BOLD:ABX5395

Sphaerophoria asymmetrica Knutson, 1973

Sphaerophoria bifurcata Knutson, 1973

Sphaerophoria brevipilosa Knutson, 1973

Sphaerophoria contigua Macquart, 1847

Sphaerophoria philanthus Meigen

Sphegina keeniana Williston, 1887

Notes: BOLD:ACR0385

Sphegina petiolata Coquillett, 1910

Spilomyia longicornis Loew, 1872

Syritta pipiens Linnaeus, 1758

Syrphus rectus Osten Sacken, 1875

Syrphus ribesii Linnaeus

Notes: BOLD:AAA4570

Syrphus torvus Osten Sacken, 1875

Notes: BOLD:AAC6088

Toxomerus geminatus Say, 1923

Notes: BOLD:AAC1312

Toxomerus marginatus Say, 1823

Notes: BOLD:AAA4277

Xanthogramma flavipes Loew, 1863

Notes: BOLD:AAK0114

Xylota quadrimaculata Loew, 1866

Family Tabanidae

Chrysops aestuans Wulp, 1867

Chrysops ater Macquart, 1850

Notes: BOLD:ACE5640

Chrysops calvus Pechuman and Teskey, 1967

Chrysops lateralis Wiedemann, 1828

Chrysops striatus Osten Sacken, 1875

Chrysops vittatus Wiedemann, 1821

Hybomitra epistates Osten Sacken, 1878

Hybomitra lasiophthalma Macquart, 1838

Notes: BOLD:AAF0889

Tabanus lineola Fabricius

Family Tachinidae

Actia interrupta Curran, 1933

Blepharomyia pagana Meigen, 1824

Notes: BOLD:AAV0903

Campylocheta teliosis Reinhard, 1952

Ceracia dentata Coquillett, 1895

Notes: BOLD:ABX6290

Homalactia harringtoni Coquillett, 1902

Notes: BOLD:AAP2717

Leschenaultia exul Townsend, 1892

Notes: BOLD:ACE2864

Lydina americana Townsend, 1892

Notes: BOLD:AAG2432

Oswaldia minor Curran, 1925

Notes: BOLD:ACF1129

Phorocera obscura Fallen, 1810

Notes: BOLD:ABY8575

Siphona hokkaidensis Mesnil, 1957

Notes: BOLD:AAG2172

Siphona intrudens Curran, 1932

Notes: BOLD:AAP2721

Siphona pisinnia O'Hara, 1983

Notes: BOLD:AAZ4865

Family Tephritidae

Euaresta bella Loew, 1862

Eurosta solidaginis Fitch, 1855

Eutreta novaeboracensis Fitch, 1855

Rhagoletis suavis Loew, 1862

Urophora cardui Linnaeus, 1758

Xanthomyia platyptera Loew, 1873

Family Tipulidae

Nephrotoma cornicina Linnaeus, 1758

Tipula (Beringotipula) coloradensis Doane, 1911

Tipula dorsimacula Walker, 1848

Notes: BOLD:AAF8990

Tipula mallochi Alexander

Family Xylomyidae

Macroceromys terminalis Vasey 1977

Solva pallipes Loew, 1863

Xylomyia americana Weid

Xylomyia simillima Steyskal 1947

Xylomyia tenthredinoides Van der Wulp 1867

Family Xylophagidae

Xylophagus lugens Loew, 1863

Notes: BOLD:AAJ9649

Xylophagus reflectens Walker, 1848

Notes: BOLD:AAM7333|BOLD:AAP7637

Order Ephemeroptera

Family Baetidae

Baetis intercalaris McDunnough, 1921

Callibaetis ferrugineus Walsh, 1862

Cloeon dipterum Linnaeus, 1761

Iswaeon anoka Daggy, 1945

Family Caenidae

Caenis latipennis Banks, 1907

Family Ephemeridae

Hexagenia limbata Serville, 1829

Family Heptageniidae

Stenacron interpunctatum Say, 1839

Order Hemiptera

Family Anthocoridae

Cardiastethus borealis Kelton, 1977

Orius insidiosus Say, 1832

Orius tristicolor White, 1879

Family Aphididae

Acyrthosiphon malvae Mosley, 1841
Notes: BOLD:AAF3206

Acyrthosiphon pisum Harris, 1776

Aphis glycines Matsumura, 1917
Notes: BOLD:AAB7938

Aphis middletonii Thomas, 1879
Notes: BOLD:AAB6817

Aphis rubicola Oestlund, 1887
Notes: BOLD:AAF7621

Eriosoma americanum Riley, C.V., 1879
Notes: BOLD:AAD7955

Eucallipterus tiliae Linnaeus, 1758
Notes: BOLD:AAD0131

Lipaphis pseudobrassicae Davis, 1914
Notes: BOLD:AAD9153

Melaphis rhois Fitch, 1866
Notes: BOLD:AAA2079

Rhopalosiphum nymphaeae Linnaeus, 1761

Schizaphis scirpicola Hille Ris Lambers, 1960
Notes: BOLD:AAD1238

Family Belostomatidae

Belostoma flumineum Say, 1832

Family Berytidae

Neoneides muticus Say, 1832

Family Cercopidae

Aphrophora alni Fallén, 1805

Aphrophora cribrata Walker, 1851

Clastoptera obtusa Say, 1825

Lepyronia quadrangularis Say, 1825

Neophilaenus lineatus Linnaeus, 1758

Philaenus spumarius subsp. *quadrimaculatus* Schrank, 1776

Philaenus spumarius Linnaeus, 1758

Family Cicadellidae

Agallia quadripunctata **Oman 1933**
Notes: BOLD:AAG2899

Agallia **sp.**

Agalliopsis ancistra **Oman 1970**

Agalliopsis **sp.**

Anoscopus flavostriatus **Donovan, 1799**

Anoscopus flavostrigata **Donovan, 1799**

Aphrodes **sp.**

Arboridia **sp.**

Athysansus argentarius **Metcalf, 1955**

Balclutha **sp.**

Ceratagallia **sp.**

Chlorotettix unicolor **Fitch 1851**

Cicadula melanogaster **Provancher 1872**

Colladonus clitellarius **Say, 1830**
Notes: BOLD:ACV9851

Cosmotettix cf. bilineatus

Cuerna striata **Walker, 1851**

Deltocephalus pulicaris **Fallén 1806**
Notes: BOLD:AAY8918

Dicraneura **sp.**

Dikraneura mali **Provancher, 1890**
Notes: BOLD:ABA5842

Dikrella cruentata **Gillette, 1898**
Notes: BOLD:AAV0158

Diplocolenus abdominalis **Fabricius 1803**
Notes: BOLD:AAG2897

Doratura stylata **Boheman, 1847**
Notes: BOLD:AAG8821

Draeculacephala constricta **Davidson et DeLong, 1943**

Draeculacephala **sp.**

Elymana caduca **DeLong 1936**

Empoasca coccinea **Fitch, 1851**

Notes: BOLD:ABA5764

Empoasca decipiens **Zachvatkin, 1935**

Notes: BOLD:AAY6741

Empoasca fabae **Cardoso, 1974**

Notes: BOLD:AAG2868|BOLD:AAG2873

Empoasca **sp.**

Erasmoneura nigra **Gillette, 1898**

Eratoneura certa **Beamer, 1932**

Notes: BOLD:ABA5787

Eratoneura flexibilis **Knull, 1949**

Notes: BOLD:AAZ8495|BOLD:AAZ8496

Errastunus ocellaris **Fallén, 1806**

Notes: BOLD:AAG8839

Erythridula dunni **Hepner, 1976**

Notes: BOLD:ABA5786

Erythridula scytha **Auten & Johnson, 1936**

Notes: BOLD:AAN8412

Erythridula tenuispica **Beamer, 1930**

Notes: BOLD:ABA5830

Erythridula wysongi **Ross & DeLong, 1953**

Notes: BOLD:AAN8287|BOLD:ABZ1306

Erythroneura aza **Robinson, 1924**

Notes: BOLD:AAY6747

Erythroneura bakeri **Dmitriev & Dietrich, 2007**

Notes: BOLD:AAV0161

Erythroneura elegans **McAtee, 1920**

Notes: BOLD:ABA5798

Erythroneura ontari **Robinson, 1924**

Notes: BOLD:ABA5810

Erythroneura ontari **Robinson, 1924**

Notes: BOLD:ABA5810

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The third of five checklists for Kingdom Animalia, this checklist contains members of Phylum Arthopoda, Class Insecta (Orders Hemiptera, Hymenoptera and Lepidoptera).

Class Insecta

Order Hemiptera

Family Cicadellidae

Erythroneura rubrella McAtee, 1920

Notes: BOLD:AAV0164|BOLD:ACC8414

Erythroneura sp.

Erythroneura tricincta Fitch, 1851

Notes: BOLD:AAY6738|BOLD:AAY6751

Erythroneura vitifex Fitch, 1856

Notes: BOLD:AAY6742|BOLD:ACQ8506

Erythroneura vitis Harris, 1831

Erythroneura vulnerata Fitch, 1851

Notes: BOLD:AAO8361|BOLD:AAY6752|BOLD:ABA5772|BOLD:ABY9043|BOLD:ABY9046|BOLD:ACQ3943| BOLD:ACV2800|BOLD:ACV2885|BOLD:ACV2886

Eupteryx atropunctata Goeze, 1778

Notes: BOLD:AAG2869

Eupteryx flavoscuta Gillette, 1898

Notes: BOLD:ABA5805

Fieberiella florii Stål, 1864

Forcipata acclina DeLong & Caldwell, 1936

Forcipata loca DeLong & Caldwell, 1936

Notes: BOLD:ACC8165

Graphocephala coccinea Forster, 1771

Graphocephala sp.

Gyponana sp.

Hymetta balteata McAtee, 1919
Notes: BOLD:AAV0157

Jikradia olitoria Say, 1830

Latalus ocellaris De Long & Sleesman, 1929

Macropsis basalis Van Duzee, 1889
Notes: BOLD:ACC9200

Macrosteles quadrilineatus Forbes, 1885
Notes: BOLD:AAA9422

Macrosteles sp.

Macrosteles variatus Fallén, 1806
Notes: BOLD:AAV0236

Neokolla hieroglyphica Say, 1830
Notes: BOLD:AAN8418

Oncopsis sobria Walker, 1851
Notes: BOLD:ACI7197

Osbornellus limosus DeLong, 1941

Penthimia americana Fitch, 1851

Scaphoideus major Osborn, 1900
Notes: BOLD:AAY6734

Scaphoideus sp.

Scaphytopius sp.

Sorhoanus pascuellus Fallén, 1826

Typhlocyba arsinoe McAtee, 1926

Typhlocyba niobe McAtee, 1926
Notes: BOLD:ABA5877

Typhlocyba pomaria McAtee, 1926
Notes: BOLD:AAF5980

Zonocyba hockingensis Knull, 1945
Notes: BOLD:ACV8488

Family Cicadidae

Tibicen canicularis **Harris, 1841**

Family Clastopteridae

Clastoptera proteus **Fitch, 1851**

Family Corixidae

Palmacorixa buenoi **Abbott, 1913**

Sehirus cinctus **Palisot, 1811**

Trichocorixa borealis **Sailer, 1948**

Trichocorixa sexcincta **Champion, 1901**

Family Cydnidae

Sehirus cinctus cinctus **Palisot, 1811**

Family Cymidae

Cymus angustatus **Stål, 1874**

Family Delphacidae

Delphacodes **sp.**

Javasella pellucida **Fabricius, 1794**

Kosswigianella lutulenta **Van Duzee, 1894**

Liburniella ornata **Stål, 1862**

Megamelus lunatus **Beamer, 1955**

Pissonotus basalis **Van Duzee, 1897**

Family Derbidae

Cedusa incisa **Metcalf, 1923**

Family Dictyopharidae

Scolops sulcipes **Say, 1825**

Family Flatidae

Metcalfa pruinosa **Say, 1830**

Family Gelastocoridae

Gelastocoris oculatus **Fabricius, 1798**

Family Gerridae

Aquarius remigis **Say, 1832**

Family Issidae

Acanalonia bivittata **Say, 1825**

Family Lygaeidae

Kleidocerys resedae subsp. *geminatus* Say, 1832

Lygaeus kalmii Stål, 1874

Nysius sp.

Family Membracidae

Atymna helena Woodruff, 1915

Notes: BOLD:AAY9905

Campylenchia latipes Say, 1824

Ceresa sp.

Cyrtolobus sp.

Enchenopa binotata Say, 1824

Entylia carinata Forster, 1771

Micrutalis calva Say, 1831

Publilia concava Say, 1824

Telamona decorata Ball, 1903

Family Miridae

Adelphocoris lineolatus Goeze, 1778

Amblytylus nasutus Kirschbaum, 1856

Capsus ater Linnaeus, 1758

Ceratocapsus sp.

Chlamydatus associatus Uhler, 1872

Notes: BOLD:AAF3365

Chlamydatus sp.

Collaria meilleurii Provancher, 1872

Criocoris saliens Reuter, 1876

Deraeocoris sp.

Fulvius slateri Wheeler, 1977

Halticus sp.

Heterocordylus malinus Slingerland, 1909

Leptopterna dolabrata Linnaeus, 1758

Litomiris sp.

Lopidea sp.

Lygidea sp.

Lygocoris pabulinus Linnaeus, 1761
Notes: BOLD:AAB2218

Lygus sp.

Nabicula subcoleoptrata Kirby, 1837

Nabis roseipennis Reuter, 1872

Neolygus sp.

Orthocephalus sp.

Orthops scutellatus Uhler, 1877

Pagasa fusca Stein, 1857

Paraproba capitata Van Duzee, 1912

Phoenicocoris strobicola Knight, 1923
Notes: BOLD:AAH8507

Phytocoris sp.

Pithanus maerkelii Herrich-Schaeffer, 1838

Plagiognathus sp.

Poecilocapsus lineatus Fabricius, 1798

Prepops sp.

Slaterocoris sp.

Stenodema trispinosa Reuter, 1904

Stenodema vicinum Provancher, 1872

Stenotus binotatus Fabricius, 1794

Taedia sp.

Family Nabidae

Hoplistoscelis sordidus Reuter, 1872

Nabis rufusculus Reuter, 1872

Family Notonectidae

Notonecta undulata Say, 1832

Family Oxycarenidae

Crophius disconotus Say, 1832

Family Pachygronthidae

Phlegyas abbreviatus Uhler, 1876

Family Pentatomidae

Acrosternum hilare Say, 1832

Banasa calva Say, 1832
Banasa dimidiata Say, 1832
Brochymena quadripustulata Fabricius, 1775
Cosmopepla lintneriana Kirkaldy, 1909
Euschistus tristigmus subsp. *luridus* Dallas, 1851
Neottiglossa undata Say, 1832
Parabrochymena arborea Say,1825
Picromerus bidens Linnaeus, 1758
Podisus maculiventris Say, 1832

Family Phymatidae
Phymata americana Melin, 1930
Piesma cinerum Say, 1832

Family Psyllidae
Pachypsylla celtidismamma Fletcher, 1882
Psyllopsis fraxinicola Foerster, 1848

Family Reduviidae
Empicornis errabundus Say, 1832
Sinea diadema Fabricius, 1776
Zelus luridus Stål, 1862
Zelus tetracanthus Stål, 1862

Family Rhopalidae
Arhyssus sp.
Harmostes reflexulus Say, 1832
Stictopleurus punctiventris Dallas, 1852

Family Rhyparochromidae
Ligyrocoris diffusus Uhler, 1871
Megalonotus sabulicola Thomson, 1870
Sphragisticus nebulosus Fallén, 1807

Family Saldidae
Saldula confluenta Say, 1832
Saldula pallipes Fabricius, 1794
Saldula saltatoria Linnaeus, 1758

Family Thyreocoridae
Corimelaena pulicaria Germar, 1839
Galgupha atra Amyot and Serville, 1843

Family Tingidae

Corythucha marmorata Uhler, 1878

Corythucha sp.

Dictyla echii Schrank, 1782

Order Hymenoptera

Family Andrenidae

Andrena andrenoides Cresson, 1878

Andrena barbilabris Kirby, 1802

Notes: BOLD:AAB4998

Andrena canadensis Dalla Torre, 1896

Andrena carlini Cockerell, 1901

Andrena erythrogaster Ashmead, 1890

Andrena hirticincta Provancher, 1888

Andrena nasonii Robertson, 1895

Andrena obscuripennis Smith, 1853

Andrena rudbeckiae Robertson, 1891

Andrena solidaginis Robertson, 1893

Andrena sp.

Andrena thaspii Graenicher, 1903

Andrena wilkella Kirby, 1802

Perdita octomaculata Say, 1824

Pseudopanurgus nebrascensis Crawford, 1903

Family Anthophoridae

Anthophora furcata Panzer, 1798

Ceratina calcarata Robertson, 1900

Ceratina dupla Say, 1837

Ceratina sp.

Melissodes desponsa Smith, 1854

Family Apidae

Apis mellifera Linnaeus, 1758

Bombus bimaculatus Cresson, 1863

Bombus borealis Kirby, 1837

Bombus griseocollis DeGeer, 1773

Bombus impatiens Cresson, 1863

Notes: BOLD:ABZ2516

Bombus perplexus Cresson, 1863

Bombus rufocinctus Cresson, 1863

Bombus vagans Smith, 1854

Ceratina mikmaqi Rehan and Sheffield, 2011

Notes: BOLD:AAA2368

Melissodes boltoniae Robertson, 1905

Melissodes communis Cresson, 1878

Melissodes druriella Kirby, 1802

Melissodes illata Lovell & Cockerell, 1906

Melissodes subillata LaBerge, 1961

Melissodes trinodis Robertson, 1901

Melissodes wheeleri Cockerell, 1906

Nomada articulata Smith, 1854

Nomada bella Cresson, 1863

Notes: BOLD:ABZ2527

Nomada bethunei Cockerell, 1903

Nomada cressonii Robertson, 1893

Nomada luteoloides Robertson, 1895

Nomada pygmaea Cresson, 1863

Notes: BOLD:ABZ6834

Nomada subrutila Lovell & Cockerell, 1905

Notes: BOLD:AAC5044

Triepeolus helianthi Robertson, 1897

Triepeolus nigrihirtus Mitchell, 1962

Triepeolus obliteratus Graenicher, 1911

Triepeolus simplex Robertson, 1903

Xylocopa virginiana Linnaeus, 1771

Family Bethylidae

Parasierola sp.

Family Braconidae

Aphidius ervi Haliday, 1834

Notes: BOLD:AAA4188

Ascogaster quadridentata **Wesmael, 1835**

Asobara rufescens **Foerster, 1862**

Notes: BOLD:AAU8583

Asobara **sp.**

Cotesia xylina **Say, 1836**

Notes: BOLD:AAA9386

Diaeretiella rapae **McIntosh, 1855**

Notes: BOLD:AAG1421

Diolcogaster facetosa **Weed, 1888**

Notes: BOLD:ABA5941

Ephedrus lacertosus **Haliday, 1833**

Notes: BOLD:ACW2698

Peristenus **sp.**

Pholetesor ornigis **Weed, 1887**

Notes: BOLD:AAB0520

Pygostolus falcatus **Nees,1834**

Spathius elegans **Matthews, 1970**

Family Chalcididae

Conura albifrons **Walsh, 1861**

Notes: BOLD:AAG8371

Family Chrysididae

Cleptes semiauratus **Linnaeus, 1761**

Family Colletidae

Colletes eulophi **Robertson, 1891**

Colletes hyalinus **Provancher, 1888**

Colletes mandibularis **Smith, 1853**

Colletes nudus **Robertson, 1898**

Colletes simulans **Cresson, 1868**

Hylaeus affinis **Smith, 1853**

Hylaeus cf. affinis

Hylaeus ellipticus **Kirby, 1827**

Hylaeus mesillae **subsp.** ***cressoni*** **Cockerell, 1907**

Hylaeus modestus **Say, 1837**

Hylaeus **sp.**

Family Crabronidae

Astata unicolor Say, 1824

Cerceris arelate Banks, 1912

Cerceris atramontensis Banks, 1913

Cerceris clypeata Dahlbom, 1844

Crossocerus annulipes Lepeletier et Brullé, 1834

Crossocerus barbipes Dahlbom, 1845

Notes: BOLD:AAG3190

Crossocerus elongatulus van der Linden, 1829

Crossocerus tarsatus subsp. *planipes* Fox, 1895

Diodontus minutus Fabricius, 1793

Ectemnius cephalotes Olivier, 1792

Ectemnius continuus Fabricius, 1804

Ectemnius lapidarius Panzer, 1804

Ectemnius maculosus Gmelin, 1781

Ectemnius stirpicola Packard, 1866

Gorytes atricornis Packard,1867

Gorytes simillimus Smith,1856

Hoplisoides nebulosus Packard, 1867

Lestica confluenta Say,1837

Lestica producticollis Packard,1866

Lyroda subita Say, 1837

Mimesa pauper Packard, 1867

Oxybelus uniglumis Linnaeus, 1758

Passaloecus cuspidatus Smith, 1856

Notes: BOLD:AAG7762

Passaloecus singularis Dahlbom, 1844

Pemphredon inornata Say, 1824

Pemphredon lethifer Shuckard, 1837

Philanthus bilunatus Cresson, 1865

Pison koreense **Radoszkowski, 1887**

Psen monticola **Packard, 1867**

Rhopalum coarctatum **Scopoli, 1763**

Saygorytes phaleratus **Say, 1837**

Solierella peckhami **Ashmead, 1897**

Stigmus americanus **Packard, 1867**

Notes: or fraternus

Stigmus fraternus **Say, 1824**

Tachysphex antennatus **Fox, 1894[", 1893"]**

Tachysphex pompiliformis **Panzer, 1803**

Trypoxylon attenuatum **Smith, 1851**

Trypoxylon carinatum **Say, 1837**

Trypoxylon clavicerum **Lepeletier & Serville, 1828**

Trypoxylon frigidum **Smith, 1856**

Notes: BOLD:AAG3193

Trypoxylon johnsoni **Fox, 1891**

Trypoxylon lactitarse **Saussure, 1867**

Trypoxylon politum **Drury, 1773**

Family Diapriidae

Belyta validicornis **Thomson, 1858**

Notes: BOLD:AAU8736

Family Encyrtidae

Copidosoma floridanum **Ashmead, 1900**

Notes: BOLD:AAA7203

Family Eupelmidae

Eupelmus vesicularis **Retzius, 1783**

Family Formicidae

Camponotus herculeanus **Linnaeus, 1758**

Notes: BOLD:AAA2372

Camponotus nearcticus **Emery, 1893**

Notes: BOLD:AAD4432

Camponotus pennsylvanicus **De Geer, 1773**

Notes: BOLD:AAA9461

Camponotus **sp.**

Crematogaster cerasi Fitch, 1855

Crematogaster sp.

Formica lasioides Emery, 1893

Notes: BOLD:AAE0406

Formica sp.

Lasius alienus Foerster, 1850

Notes: BOLD:AAA9049

Lasius claviger Roger, 1862

Lasius nearcticus Wheeler, 1906

Notes: BOLD:AAD1528

Lasius neoniger Emery, 1893

Notes: BOLD:AAB9126

Lasius sp.

Leptothorax ambiguus Emery, 1895

Myrmica sp.

Ponera pennsylvanica Buckley, 1866

Notes: BOLD:AAF0443

Prenolepis imparis Say, 1836

Notes: BOLD:AAC1302

Stenamma brevicorne Mayr, 1886

Notes: BOLD:AAH7068

Stigmatomma pallipes Haldeman, 1844

Tapinoma sessile Say, 1836

Notes: BOLD:AAA3893|BOLD:AAA3900

Temnothorax ambiguus Emery, 1895

Notes: BOLD:AAG0685

Family Halictidae

Agapostemon radiatus Forster, 1771

Agapostemon sericeus Förster, 1771

Agapostemon virescens Fabricius, 1775

Augochlora aurata Smith, 1853

Augochlora pura Say, 1837

Augochlorella aurata Smith, 1853

Notes: BOLD:AAD6445

***Dialictus* sp.**

***Halictus confusus* Smith, 1853**

***Halictus ligatus* Say, 1837**

***Halictus rubicundus* Christ, 1791**

***Lasioglossum anomalum* Robertson, 1892**

***Lasioglossum atwoodi* Gibbs, 2010**

***Lasioglossum birkmanni* Crawford, 1906**

***Lasioglossum bruneri* Crawford, 1902**

***Lasioglossum comagenense* (Knerer & Atwood, 1964)**

***Lasioglossum coriaceum* Smith, 1853**

Notes: BOLD:AAB7007

***Lasioglossum cressonii* Robertson, 1890**

***Lasioglossum dreisbachi* Mitchell, 1960**

***Lasioglossum ephialtum* Gibbs, 2010**

***Lasioglossum fattigi* Mitchell, 1960**

***Lasioglossum foxii* Robertson, 1895**

***Lasioglossum heterognathum* Mitchell, 1960**

***Lasioglossum hitchensi* Gibbs, 2012**

***Lasioglossum imitatum* Smith, 1853**

***Lasioglossum leucozonium* Schrank, 1781**

***Lasioglossum lineatulum* Crawford, 1906**

***Lasioglossum macoupinense* Robertson, 1895**

***Lasioglossum michiganense* Mitchell, 1960**

***Lasioglossum nigroviride* Graenicher, 1911**

***Lasioglossum paradmirandum* Knerer & Atwood, 1966**

***Lasioglossum pectinatum* Robertson, 1890**

***Lasioglossum pectorale* Smith, 1853**

***Lasioglossum perpunctatum* Ellis, 1913**

***Lasioglossum pilosum* Smith, 1853**

***Lasioglossum platyparium* Robertson, 1895**

***Lasioglossum pruinosum* Robertson, 1892**

Lasioglossum sp. 1

Lasioglossum sp. 2

Lasioglossum subversans Mitchell, 1960

Lasioglossum tegulare Robertson, 1890

Lasioglossum tenax Sandhouse, 1924

Lasioglossum timothyi Gibbs, 2010

Lasioglossum versans Lovell, 1905

Notes: BOLD:ABZ6180

Lasioglossum versatum Robertson, 1902

Lasioglossum vierecki Crawford, 1904

Lasioglossum weemsi Mitchell, 1960

Lasioglossum zonulum Smith, 1848

Lasioglossum zophops Ellis, 1914

Sphecodes atlantis Mitchell, 1956

Sphecodes clematidis Robertson, 1897

Sphecodes confertus Say, 1837

Sphecodes cressonii Robertson, 1903

Sphecodes davisii Robertson, 1897

Sphecodes dichrous Smith, 1853

Sphecodes heraclei Robertson, 1897

Sphecodes levis Lovell & Cockerell, 1907

Sphecodes minor Robertson, 1898

Sphecodes persimilis Lovell & Cockerell, 1907

Sphecodes pycnanthemi Robertson, 1897

Sphecodes ranunculi Robertson, 1897

Notes: BOLD:AAC7655

Sphecodes sp.

Sphecodes stygius Robertson, 1893

Sphecodes wheeleri Mitchell, 1956

Family Ichneumonidae

Agrothereutes abbreviatus Fabricius, 1794

Notes: BOLD:AAG7687

Agrypon flexorium Thunberg, 1822

Notes: BOLD:AAH7052

Aritranis director Thunberg, 1822

Notes: BOLD:AAG7768

Bathyplectes anurus **Thomson, 1887**
Notes: BOLD:ABA6269

Bathythrix decipiens **Gravenhorst, 1829**
Notes: BOLD:AAU8495

Campoletis flavicincta **Ashmead, 1890**
Notes: BOLD:AAZ8146

Cryptus albitarsis **Cresson, 1864**
Notes: BOLD:AAH1693

Cylloceria melancholica **Gravenhorst, 1820**

Cymodusa distincta **Cresson, 1864**
Notes: BOLD:ABZ4364

Diadegma pendulum **Walley, 1967**
Notes: BOLD:AAZ9563

Dialipsis dissimilis **Dasch, 1992**
Notes: BOLD:ABA6048

Diplazon laetatorius **Fabricius, 1781**
Notes: BOLD:AAD4214

Dolichomitus irritator **Fabricius, 1775**
Notes: BOLD:AAU8680

Dusona minor **Provancher, 1879**
Notes: BOLD:AAH1652

Enytus apostata **Gravenhorst, 1829**
Notes: BOLD:AAG5797

Exochus nigripalpis **Thomson, 1887**
Notes: BOLD:AAG7713

Hyposoter inquinatus **Holmgren, 1860**
Notes: BOLD:AAU8361

Ichneumon discoensis **Fox, 1892**
Notes: BOLD:ACE9045

Ischnus inquisitorius **Muller, 1776**
Notes: BOLD:AAG7737

Iseropus stercorator **Fabricius, 1793**
Notes: BOLD:AAO2094

Lissonota coracina Gmelin, 1790

Megacara hortulana Gravenhorst, 1829

Notes: BOLD:AAU8687

Mesochorus suomiensis Schwenke, 1999

Notes: BOLD:AAZ1979

Ophion bilineatus Say, 1829

Notes: BOLD:AAG8323

Ophion clave Viereck, 1905

Notes: BOLD:AAG7774

Ophion idoneus Viereck, 1905

Notes: BOLD:AAN8172

Ophion sp. 5 MDS2014

Notes: BOLD:AAI3361

Oresbius taeniatus Townes, 1962

Orthocentrus fulvipes Gravenhorst, 1829

Notes: BOLD:AAM9125

Phobocampe bicingulata Gravenhorst, 1829

Notes: BOLD:AAM7401

Pimpla aequalis Provancher, 1880

Notes: BOLD:AAG7634

Pleolophus basizonus Gravenhorst

Podoschistus vittifrons Cresson, 1868

Notes: BOLD:AAL0380

Stenomacrus nemoralis Holmgren, 1858

Notes: BOLD:AAM7494

Tranosema rostrale Brischke, 1880

Notes: BOLD:AAD1926

Zaglyptus varipes Gravenhorst, 1829

Family Leucospidae

Leucospis affinis Say, 1824

Family Megachilidae

Anthidiellum notatum Latreille, 1809

Anthidium manicatum **Linnaeus, 1758**

Coelioxys rufitarsus **Smith, 1854**

Heriades variolosa **subsp. *variolosa* Cresson, 1872**

Hoplitis pilosifrons **Cresson, 1864**

Hoplitis producta **Cresson, 1864**

Hoplitis truncata **Cresson, 1878**

Megachile brevis **Say, 1837**

Megachile campanulae **Robertson, 1903**

Megachile frigide **Smith, 1853**

Megachile gemula **Cresson, 1878**

Megachile inermis **Provancher, 1888**

Megachile latimanus **Say, 1823**

Megachile lippiae **Cockerell, 1900**

Megachile mendica **Cresson, 1878**

Megachile montivaga **Cresson, 1878**

Megachile perihirta **Cockerell, 1898**

Megachile pugnata **Say, 1837**

Megachile relativa **Cresson, 1878**

Megachile rotundata **Fabricius, 1793**

Megachile texana **Cresson, 1878**

Osmia coerulescens **Mitchell, T.B. 1962**

Osmia conjuncta **Cresson, 1864**

Osmia lignaria **Say, 1837**

Notes: BOLD:AAE5495

Osmia proxima **Cresson, 1864**

Osmia pumila **Cresson, 1864**

Stelis lateralis **Cresson, 1864**

Family Mutillidae

Myrmosa unicolor **Say, 1824**

Pseudomethoca frigida **Smith 1855**

Family Mymaridae

Anaphes listronoti **Huber, 1997**

Gonatocerus morrilli **Howard, 1908**

Ooctonus silvensis **Girault, 1916**

Notes: BOLD:AAN7553

Family Platygastridae

Platygaster variabilis Fouts, 1924
Notes: BOLD:ABW3242

Synopeas pennsylvanicum Fouts, 1924
Notes: BOLD:ABA6127

Telenomus podisi Ashmead, 1893
Notes: BOLD:AAG7891|BOLD:AAY9192|BOLD:ACU5364

Family Pompilidae

Agenioideus cinctellus Spinola, 1808

Agenioideus humilis Cresson, 1867

Anoplius imbellis Banks, 1944

Anoplius nigerrimus van der Vecht, 1973

Anoplius virginiensis Cresson

Aporinellus wheeleri Baquaert, 1919

Arachnospila michiganensis subsp. *michiganensis* (Dreisbach)

Auplopus carbonarius Scopoli, 1763

Auplopus mellipes subsp. *variitarsatus* Dalla Torre, 1897

Auplopus nigrellus Banks, 1912

Caliadurgus fasciatellus subsp. *alienatus* Smith, 1855

Dipogon sayi subsp. *sayi* Banks, 1941

Episyron biguttatus subsp. *biguttatus* Fabricius, 1798

Priocnemis cornica Say, 1836

Priocnemis germana Cresson, 1867

Priocnemis minorata Banks, 1912

Priocnemis notha subsp. *notha* Cresson, 1867

Priocnemis scitula subsp. *relicta* Banks, 1912

Family Pteromalidae

Mesopolobus bruchophagi Gahan, 1917
Notes: BOLD:ACL4975

Family Sapygidae

Sapyga centrata Say, 1836
Notes: BOLD:ACL7820

Family Sierolomorphidae

Sierolomorpha canadensis Provancher, 1888

Family Siricidae

Tremex columba Linnaeus

Family Sphecidae

Chalybion californicum de Saussure, 1867

Isodontia auripes Fernald, 1906

Isodontia mexicana de Saussure, 1867

Sceliphron caementarium Drury, 1773

Sphex ichneumoneus Linnaeus, 1758

Family Tenthredinidae

Ametastegia aperta Norton, 1861

Notes: BOLD:AAI4543

Ametastegia pallipes Spinola

Notes: BOLD:AAE5602

Caulocampus acericaulis MacGillivray, 1906

Notes: BOLD:ACJ9109

Dolerus asper Zaddach, 1859

Notes: BOLD:AAG7773

Dolerus nitens Zaddach 1859

Notes: BOLD:ACV5952

Empria maculata Norton, 1861

Notes: BOLD:ACC8799

Empria nordica Ross 1936

Notes: BOLD:ACI4328

Fenusa ulmi Sundevall

Notes: BOLD:AAN7643

Halidamia affinis Fallén 1807

Notes: BOLD:AAN7641

Macrophya flavolineata Norton 1860

Notes: BOLD:ABU8852

Metallus lanceolatus Thomson, 1870

Notes: BOLD:AAP1085

Monophadnus pallescens Gmelin 1790
Notes: BOLD:ACK2140

Pachynematus extensicornis Norton
Notes: BOLD:AAN8130

Periclista sp. tM8
Notes: BOLD:AAG3550

Priophorus compressicornis Fabricius, 1804
Notes: BOLD:ACI7354

Pristiphora chlorea Norton 1867
Notes: BOLD:ACG2990|BOLD:ACM9731

Taxonus epicera Say 1836
Notes: BOLD:ACC7921

Taxonus pallicoxus Provancher 1885
Notes: BOLD:AAG7788

Taxonus terminalis Say 1824
Notes: BOLD:AAU8702

Tomostethus multicinctus Rohwer
Notes: BOLD:ACV5036

Family Trichogrammatidae

Trichogramma platneri Nagarkatti, 1975
Notes: BOLD:AAE0242

Family Vespidae

Ancistrocerus adiabatus subsp. *adiabatus* Saussure, 1852

Ancistrocerus albophaleratus de Saussure, 1855

Ancistrocerus antilope subsp. *antilope* Panzer, 1798

Ancistrocerus campestris Saussure, 1852

Ancistrocerus catskill Saussure, 1853

Ancistrocerus unifasciatus subsp. *unifasciatus* Saussure, 1852

Dolichovespula arenaria Fabricius
Notes: BOLD:ACE9710

Eumenes crucifer **Provancher, 1888**

Eumenes fraternus **Say**

Euodynerus foraminatus **subsp. *foraminatus* de Saussure, 1853**

Euodynerus leucomelas **subsp. *leucomelas* de Saussure, 1856**

Monobia quadridens **Linnaeus, 1763**

Parancistrocerus leionotus **Viereck, 1906**

Parancistrocerus pedestris **de Saussure, 1855**

Notes: subsp pedestris? No authorship found

Parancistrocerus pensylvanicus **de Saussure, 1856**

Parancistrocerus pensylvanicus **subsp. *pensylvanicus* de Saussure, 1856**

Polistes dominula **Christ, 1791**

Notes: BOLD:AAB7105

Polistes fuscatus **Fabricius, 1793**

Symmorphus canadensis **Saussure, 1855**

Symmorphus cristatus **Saussure, 1856**

Vespula flavopilosa **Jakobson, 1978**

Vespula germanica **Fabricius, 1793**

Notes: BOLD:AAG9055

Vespula maculifrons **Buysson**

Notes: BOLD:AAD5593

Vespula vidua **de Saussure, 1854**

Notes: BOLD:AAN8137

Vespula vulgaris **Linnaeus, 1758**

Order Lepidoptera

Family Blastobasidae

Asaphocrita busckiella **Dietz, 1910**

Notes: BOLD:AAA8938

Blastobasis glandulella **Riley, 1871**

Notes: BOLD:AAB1096

Family Bucculatricidae

Bucculatrix ainsliella **Murtfeldt 1905**

Notes: BOLD:AAB4931

Bucculatrix pomifoliella **Clemens, 1860**

Notes: BOLD:AAD2085

Family Cosmopterigidae

Cosmopterix montisella Chambers, 1875
Notes: BOLD:AAH4285

Teladoma helianthi Busck, 1932
Notes: BOLD:AAE1519

Family Crambidae

Acentria ephemerella Denis & Schiffermüller, 1775

Agriphila vulgivagella Clemens, 1860

Anania funebris Ström, 1768
Notes: BOLD:AAB4181

Desmia maculalis Westwood, 1832
Notes: BOLD:ACE8375

Elophila gyralis Hulst, 1886

Elophila icciusalis Walker, 1859

Elophila tinealis Munroe, 1972

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The fourth of five checklists for Kingdom Animalia, this checklist contains members of Phylum Arthopoda, Class Insecta (Orders Lepidoptera to Trichoptera), and Class Malacostraca. From Phylum Chordata, it contains Classes Actinopterygii, Amphibia, and Aves (Orders Anseriformes to Passeriformes).

Kingdom Animalia
Phylum Arthropoda
Class Insecta
Order Lepidoptera
Family Crambidae

Loxostege sticticalis Linnaeus, 1761

Microcrambus elegans Clemens, 1860

Nomophila nearctica Munroe, 1973

Perispasta caeculalis Zell., 1875

Petrophila bifascialis Robinson, 1869

Sitochroa palealis Denis & Schiffermüller, 1775

Udea rubigalis Guenée, 1854

Urola nivalis Drury, 1773

Family Depressariidae

Agonopterix arenella Denis & Schiffermüller, 1775

Notes: BOLD:AAC6982

Agonopterix pulvipennella Clemens, 1864

Notes: BOLD:AAA7550

Depressaria depressana Fabricius, 1775

Machimia tentoriferella Clemens, 1860

Family Drepanidae

Drepana arcuata Walker

Family Elachistidae

Perittia herrichiella Herrich-Schaffer, 1855

Family Epermeniidae

Epermenia albapunctella Busck, 1908

Notes: BOLD:AAF0142

Family Erebidae

Apantesis phalerata Harris, 1841

Cisseps fulvicollis Hübner, 1818

Ctenucha virginica Esper, 1794

Hypena madefactalis Guenée, 1854

Hypena scabra Fabricius, 1798

Hyphantria cunea Drury, 1773

Lymantria dispar subsp. *dispar* Linnaeus, 1758

Rivula propinqualis Guenée, 1854

Notes: BOLD:AAA4282

Family Gelechiidae

Bryotropha hodgesi Rutten & Karsholt, 2004

Notes: BOLD:AAH4276

Chionodes fondella Busck, 1906

Notes: BOLD:ABA4737

Chrysoesthia sexguttella Thunberg, 1794
Notes: BOLD:AAD8505

Dichomeris furia Hodges, 1986
Notes: BOLD:AAI9560

Dichomeris inserrata Walsingham, 1882
Notes: BOLD:AAH4488

Dichomeris leuconotella Busck, 1904

Dichomeris ligulella Hübner, 1818
Notes: BOLD:AAA8109

Dichomeris mercatrix Hodges, 1986

Helcystogramma hystricella Braun, 1921
Notes: BOLD:AAE7016

Metzneria lappella Linnaeus, 1758

Monochroa fragariae Busck, 1919

Scrobipalpa acuminatella Sircom, 1850
Notes: BOLD:AAC1644

Scrobipalpula physaliella Chambers, 1872
Notes: BOLD:ACB8750

Scrobipalpula sacculicola Braun, 1925
Notes: BOLD:ABY8834

Sinoe chambersi Lee, 2012
Notes: BOLD:ACF2217

Xenolechia ontariensis Keifer, 1933
Notes: BOLD:AAC6357

Family Geometridae

Alsophila pometaria Harris, 1841
Notes: BOLD:AAB0196

Besma quercivoraria Guenée in Boisduval and Guenée, 1858

Biston betularia Linnaeus, 1758

Campaea perlata Guenée in Boisduval and Guenée, 1858

Coryphista meadii Packard, 1874

Costaconvexa centrostrigaria Wollaston, 1858

Ecliptopera silaceata [Denis and Schiffermüller], 1775

Ennomos magnaria **Guenée in Boisduval and Guenée, 1858**

Epirrhoe alternata **Müller, 1764**

Euchlaena serrata **Drury, 1773**

Idaea dimidiata **Hufnagel, 1767**

Operophtera bruceata **Hulst, 1886**

Notes: BOLD:AAA2999

Orthonama obstipata **Fabricius, 1794**

Phigalia titea **Cramer, 1780**

Notes: BOLD:AAA5234

Plagodis phlogosaria **Guenée in Boisduval and Guenée, 1858**

Notes: BOLD:AAA3984

Pleuroprucha insulsaria **Guenée in Boisduval and Guenée, 1858**

Scopula inductata **Guenée in Boisduval and Guenée, 1858**

Speranza pustularia **Guenée in Boisduval and Guenée, 1858**

Notes: BOLD:AAA4456

Synchlora frondaria **Guenée in Boisduval and Guenée, 1858**

Trichodezia albovittata **Guenée in Boisduval and Guenée, 1858**

Notes: BOLD:AAA6926

Xanthorhoe ferrugata **Clerck, 1759**

Notes: BOLD:AAA3817

Xanthorhoe lacustrata **Guenée in Boisduval and Guenée, 1858**

Notes: BOLD:AAA8660

Family Gracillariidae

Acrocercops astericola **Frey & Boll, 1873**

Notes: BOLD:AAD3996

Caloptilia packardella **Chambers, 1872**

Notes: BOLD:AAD2590

Cameraria saccharella **Braun, 1908**

Notes: BOLD:AAH4493

Cremastobombycia solidaginis **Frey & Boll, 1876**

Parornix betulae **Stainton, 1854**

Notes: BOLD:AAE3418

Parornix crataegifoliella **Clemens, 1860**

Notes: BOLD:AAF8198

Phyllocnistis ampelopsiella Chambers, 1871
Notes: BOLD:AAI3015

Phyllocnistis vitegenella Clemens, 1859
Notes: BOLD:AAI3014

Phyllonorycter clemensella Chambers, 1871
Notes: BOLD:AAN8981

Phyllonorycter maestingella Müller, 1764
Notes: BOLD:AAL6962

Phyllonorycter ostryaefoliella Clemens, 1859
Notes: BOLD:AAD7999

Phyllonorycter propinquinella Braun, 1908
Notes: BOLD:AAH4497

Phyllonorycter salicifoliella Chambers, 1871
Notes: BOLD:AAD4915

Phyllonorycter trinotella Braun, 1908
Notes: BOLD:AAG1128

Phyllonorycter tritaenianella Chambers, 1871
Notes: BOLD:AAF6577

Family Hesperiidae

Anatrytone logan W. H. Edwards, 1863

Ancyloxypha numitor Fabricius, 1793

Atalopedes campestris Boisduval, 1852

Carterocephalus palaemon Pallas, 1771

Epargyreus clarus Cramer, 1775

Erynnis baptisiae W. Forbes, 1936

Erynnis juvenalis Fabricius, 1793
Notes: BOLD:AAC6872

Erynnis lucilius Scudder and Burgess, 1870

Euphyes conspicua W. H. Edwards, 1863

Euphyes dion W. H. Edwards, 1879

Euphyes vestris Boisduval, 1852

Pholisora catullus Fabricius, 1793

Poanes hobomok T. Harris, 1862

Poanes massasoit Scudder, 1863

Poanes viator W. H. Edwards, 1865

Polites mystic W. H. Edwards, 1863

Polites origenes Fabricius, 1793

Polites peckius W. Kirby, 1837

Polites themistocles Latreille, 1824

Pompeius verna W. H. Edwards, 1862

Thymelicus lineola Ochsenheimer, 1808

Wallengrenia egeremet Scudder, 1863

Family Lasiocampidae

Malacosoma disstria Hubner

Notes: BOLD:AAA4130

Tolype velleda Stoll, 1791

Family Lycaenidae

Celastrina ladon Cramer, 1780

Celastrina neglecta W. H. Edwards, 1862

Cupido comyntas Godart, 1824

Feniseca tarquinius Fabricius, 1793

Lycaena hyllus Cramer, 1775

Satyirum titus Fabricius, 1793

Satyrium acadicum W. H. Edwards, 1862

Satyrium calanus Hübner, 1809

Satyrium caryaevorus McDunnough, 1942

Satyrium liparops LeConte, 1833

Family Lymantriidae

Dasychira basiflava Packard, 1864

Orgyia definita Packard, 1864

Orgyia leucostigma J. E. Smith, 1797

Family Momphidae

Mompha terminella Humphreys & Westwood, 1845

Notes: BOLD:AAX4784

Family Nepticulidae

Ectoedemia argyropeza Zeller, 1839

Notes: BOLD:AAC1036

Stigmella microtheriella Stainton, 1854
Notes: BOLD:AAI0007

Stigmella rhamnicola Braun, 1916
Notes: BOLD:AAU7678

Family Noctuidae

Achatia distincta Hübner, 1813
Notes: BOLD:AAB7392

Agrotis ipsilon Hufnagel, 1766

Agrotis venerabilis Walker, 1857

Allagrapha aerea Hübner, 1803

Amphipoea americana Speyer, 1875

Amphipoea interoceanica Smith, 1899

Amphipyra pyramidoides Guenée, 1852
Notes: BOLD:AAA8525

Anathix ralla Grote and Robinson, 1868
Notes: BOLD:AAC9569

Apamea devastator Brace, 1819

Autographa precationis Guenée, 1852

Caenurgina crassiuscula Haworth, 1809

Catocala cerogama Guenée, 1852
Notes: BOLD:AAB3383

Catocala grynea Cramer, 1779

Cerastis tenebrifera Walker, 1865
Notes: BOLD:AAC1487

Chrysodeixis includens Walker, 1858

Crocigrapha normani Grote, 1874
Notes: BOLD:AAA6924

Cucullia asteroides Guenée, 1852

Cucullia convexipennis Grote and Robinson, 1868

Euplexia benesimilis McDunnough, 1922
Notes: BOLD:AAA4097

Eupsilia devia Grote, 1875
Notes: BOLD:AAD9847

Feltia jaculifera **Guenée, 1852**

Hyppa xylinoides **Guenée, 1852**

Notes: BOLD:ABY9574

Idia aemula **Hübner, 1814**

Lacinipolia meditata **Grote, 1873**

Lacinipolia renigera **Stephens, 1829**

Leucania commoides **Guenée, 1852**

Leucania multilinea **Walker, 1856**

Leucania phragmitidicola **Guenée, 1852**

Leucania pseudargyria **Guenée, 1852**

Loscopia velata **Walker, 1865**

Macrochilo absorptalis **Walker, 1859**

Melanchra adjuncta **Guenée, 1852**

Notes: BOLD:ACF4823

Meropleon diversicolor **Morrison, 1874**

Morrisonia confusa **Hübner, 1831**

Notes: BOLD:AAA6652

Mythimna unipuncta **Haworth, 1809**

Noctua pronuba **Linnaeus, 1758**

Ochropleura implecta **Lafontaine, 1998**

Oligia modica **Guenée, 1852**

Orthosia hibisci **Guenée, 1852**

Notes: BOLD:AAA4128

Orthosia rubescens **Walker, 1865**

Notes: BOLD:AAC0946

Palthis angulalis **Hübner, 1796**

Notes: BOLD:AAA3933

Peridroma saucia **Hübner, 1808**

Phalaenostola metonalis **Walker, 1859**

Protodeltote albidula **Guenée, 1852**

Pseudohermonassa bicarnea **Guenée, 1852**

Renia adspergillus **Bosc, 1800**

Striacosta albicosta **Smith, 1888**

Sunira bicolorago **Guenée, 1852**

Notes: BOLD:AAA4426

Xestia smithii Snellen, 1896

Notes: BOLD:AAA2590

Family Nolidae

Nola ovilla Grote, 1875

Notes: BOLD:AAD1810

Family Notodontidae

Schizura unicornis J. E. Smith, 1797

Symmerista leucitys Franclemont, 1946

Family Nymphalidae

Aglais milberti Godart, 1819

Asterocampa clyton Boisduval and Le Conte, 1835

Boloria Bellona Fabricius, 1775

Boloria selene [Schiffermüller], 1775

Cercyonis pegala Fabricius, 1775

Chlosyne nycteis E. Doubleday, 1847

Coenonympha tullia Müller, 1764

Danaus plexippus Linnaeus, 1758

Euphydryas phaeton Drury, 1773

Euptoieta claudia Cramer, 1775

Junonia coenia Hübner, 1822

Lethe anthedon A. Clark, 1936

Lethe appalachia R. Chermock, 1947

Lethe eurydice Linnaeus, 1763

Libytheana carinenta Cramer, 1777

Limenitis archippus Cramer, 1775

Limenitis arthemis Drury, 1773

Megisto cymela Cramer, 1777

Nymphalis antiopa Linnaeus, 1758

Nymphalis l-album [Schiffermüller], 1775

Phyciodes cocyta Cramer, 1777

Phyciodes tharos Drury, 1773

Polygonia comma T. Harris, 1842

Polygonia interrogationis Fabricius, 1798

Polygonia progne **Cramer, 1775**

Speyeria Cybele **Fabricius, 1775**

Vanessa atalanta **Linnaeus, 1758**

Vanessa cardui **Linnaeus, 1758**

Vanessa virginiensis **Drury, 1773**

Family Papilionidae

Papilio canadensis **Rothschild and Jordan, 1906**

Papilio cresphontes **Cramer, 1777**

Papilio glaucus **Linnaeus, 1758**

Papilio polyxenes **Fabricius, 1775**

Family Pieridae

Colias eurytheme **Boisduval, 1852**

Colias philodice **Godart, 1819**

Pieris oleracea **T. Harris, 1829**

Pieris rapae **Linnaeus, 1758**

Pyrisitia lisa **Boisduval and Le Conte, 1830**

Family Plutellidae

Plutella porrectella **Linnaeus, 1758**

Notes: BOLD:ACG9804

Plutella xylostella **Linnaeus, 1758**

Notes: BOLD:AAA1513

Family Psychidae

Psyche casta **Pallas, 1767**

Notes: BOLD:ACL8669

Family Pterophoridae

Gillmeria pallidactyla **Haworth, 1811**

Hellinsia homodactylus **Walker, 1864**

Hellinsia pectodactylus **Staudinger, 1859**

Family Sphingidae

Deidamia inscriptum **Harris, 1839**

Notes: BOLD:AAB0001

Family Tischeriidae

Coptotriche badiiella **Chambers, 1875**

Notes: BOLD:ACU4456

Family Tortricidae

Acleris chalybeana Fernald, 1882
Notes: BOLD:AAA7667

Acleris cornana McDunnough, 1933

Ancylis muricana Walsingham, 1879
Notes: BOLD:AAU7760

Argyrotaenia mariana Fernald, 1882
Notes: BOLD:AAA4119

Choristoneura rosaceana Harris, 1841
Notes: BOLD:AAA1517

Cochylis hoffmanana Kearfott, 1907
Notes: BOLD:AAB3571

Cochylis temerana Busck, 1907
Notes: BOLD:AAB7534

Endothenia hebesana Walker, 1863

*Epinotia mediovirida*na Kearfott, 1908

Eucosma similana Clemens, 1860

Grapholita prunivora Walsh, 1868
Notes: BOLD:AAG0330

Olethreutes atrodentana Fernald, 1882

Olethreutes fasciatana Clemens, 1860

Olethreutes permundana Clemens, 1860

Pandemis lamprosana Robinson, 1869

Phaneta ochrocephala Walsingham, 1895

Phaneta parmatana Clemens, 1860

Phaneta tomonana Kearfott, 1907

Platynota idaeusalis Walker, 1859
Notes: BOLD:ABY7901

Pristerognatha fuligana Denis & Schiffermüller, 1775
Notes: BOLD:AAC7661

Proteoteras aesculana Riley, 1881
Notes: BOLD:AAA6740

Order Mantodea

Family Mantidae

***Mantis religiosa* subsp. *religiosa* Linnaeus, 1758**

Order Mecoptera

Family Bittacidae

***Bittacus strigosus* Hagen, 1861**

Family Panorpidae

***Panorpa galerita* Byers, 1962**

***Panorpa latipennis* Hine, 1901**

***Panorpa subfurcata* Westwood, 1846**

Order Neuroptera

Family Chrysopidae

***Chrysopa oculata* Say, 1839**

Family Hemerobiidae

***Hemerobius humulinus* Linnaeus, 1758**

Notes: BOLD:AAG0892|BOLD:AAN7492

***Hemerobius stigma* Stephens, 1836**

Notes: BOLD:AAG0891

***Micromus posticus* Walker, 1853**

Notes: BOLD:AAG0906

Order Odonata

Family Aeshnidae

***Aeshna umbrosa* Walker, 1908**

***Anax junius* Drury, 1773**

Family Calopterygidae

***Hetaerina americana* Fabricius, 1798**

Family Coenagrionidae

***Argia moesta* Hagen, 1861**

***Enallagma antennatum* Say, 1839**

***Enallagma civile* Hagen, 1861**

***Enallagma ebrium* Hagen, 1861**

***Enallagma exsulans* Hagen, 1861**

***Enallagma geminatum* Kellicott, 1895**

***Enallagma signatum* Hagen, 1861**

***Ischnura kellicotti* Williamson, 1898**

Ischnura posita Hagen, 1861

Ishnura verticalis Say, 1839

Nehalennia irene Hagen, 1861

Family Lestidae

Lestes disjunctus Selys, 1862

Lestes rectangularis Say, 1839

Family Libellulidae

Erythemis simplicicollis Say, 1839

Libellula luctuosa Burmeister, 1839

Libellula pulchella Drury, 1773

Libellula quadrimaculata Linnaeus, 1758

Pachydiplax longipennis Burmeister, 1839

Plathemis lydia Drury, 1773

Sympetrum internum Montgomery, 1943

Sympetrum obtrusum Hagen, 1867

Sympetrum semicinctum Say, 1839

Tramea lacerat Hagen, 1861

Order Orthoptera

Family Acrididae

Cholealtis conspera Harris, 1841

Chorthippus curtipennis Harris, 1835

Chortophaga viridifasciata De Geer, 1773

Dissosteira carolina Linnaeus, 1758

Dissosteria carolina Linnaeus, 1758

Melanoplus bivatattus Say, 1825

Melanoplus sanguinipes subsp. *sanguinipes* Fabricius, 1798

Melanoplus sp.

Family Gryllidae

Allonemobius fasciatus De Geer, 1773

Gryllus veletis Alexander and Bigelow, 1960

Oecanthus nigricornis F. Walker, 1869

Oecanthus quadripunctatus Beutenmuller, 1894

Family Tetrigidae

Tetrix arenonsum subsp. *angusta* Hancock, 1896

Tetrix subulata Linnaeus, 1761

Family Tetrigoniidae

Conocephalus brevipennis **Scudder, 1863**

Scudderia **sp.**

Order Phasmatodea

Family Heteronemiidae

Diapheromera femorata **Say, 1824**

Order Plecoptera

Family Chloroperlidae

Sweltsa onkos **Ricker, 1935**

Order Psocoptera

Family Amphipsocidae

Polypsocus corruptus **Hagen, 1861**

Family Caeciliidae

Caecillius **sp.**

Family Caeciliusidae

Valenzuela flavidus **Stephens, 1836**

Notes: BOLD:AAH3228|BOLD:AAN8447

Family Ectopsocidae

Ectopsocus meridionalis **Ribaga, 1904**

Family Mesopsocidae

Mesopsocus unipunctatus **Müller, 1764**

Family Peripsocidae

Peripsocus subfasciatus **Rambur, 1842**

Family Psocidae

Blaste opposita **Banks, 1907**

Metylophorus novaescotiae **Walker, 1853**

Family Stenopsocidae

Graphopsocus cruciatus **Linnaeus, 1768**

Notes: BOLD:ACA2933|BOLD:ACB0984

Order Thysanoptera

Family Aeolothripidae

Aeolothrips ericae **Bagnall, 1920**

Notes: BOLD:ABA2981

Family Phlaeothripidae

Haplothrips verbasci Osborn, 1897
Notes: BOLD:AAI6861

Family Thripidae

Chirothrips manicatus Haliday, 1836

Odontothrips biuncus John, 1921

Taeniothrips inconsequens Uzel, 1895
Notes: BOLD:ACC0651

Order Trichoptera

Family Helicopsychidae

Helicopsyche borealis Hagen, 1861

Family Hydropsychidae

Ceratopsyche morosa Hagen, 1861
Notes: BOLD:AAA3679

Cheumatopsyche campyla Ross, 1938
Notes: BOLD:AAA3892|BOLD:ACE5263

Hydropsyche phalerata Hagen, 1861
Notes: BOLD:AAC3243

Family Hydroptilidae

Agraylea multipunctata Curtis, 1834

Hydroptila armata Ross, 1938

Hydroptila perdita Morton, 1905
Notes: BOLD:AAE5187

Hydroptila spatulata Morton, 1905
Notes: BOLD:AAD0137

Orthotrichia cristata Morton, 1905

Family Leptoceridae

Oecetis avara Banks, 1895

Oecetis cinerascens Hagen, 1861

Oecetis inconspicua Walker, 1852
Notes: BOLD:AAA1532

Oecetis nocturna Ross, 1966

Family Limnephilidae

Ironoquia punctatissima Walker, 1852

Pycnopsyche antica Walker, 1852

Family Phryganeidae

Banksiola crotchi Banks, 1944

Family Polycentropodidae

Plectrocnemia cinerea Hagen, 1861

Notes: BOLD:AAA3441|BOLD:ACL7631

Class Malacostraca

Order Amphipoda

Family Hyalellidae

Hyalella azteca Saussure, 1858

Order Decapoda

Family Cambaridae

Orconectes propinquus Girard, 1852

Order Isopoda

Family Trachelipodidae

Trachelipus rathkii Brandt, 1833

Notes: BOLD:AAH4102

Family Trichoniscidae

Hyloniscus riparius Koch, 1838

Notes: BOLD:AAV6495

Trichoniscus pusillus Brandt, 1833

Notes: BOLD:AAN7523

Phylum Chordata

Class Actinopterygii

Order Cypriniformes

Family Catostomidae

Catostomus catostomus Forster, 1773

Catostomus commersonii Lacepède, 1803

Hypentelium nigricans Lesueur, 1817

Moxostoma erythrurum Rafinesque, 1818

Moxostoma valenciennesi Jordan, 1885

Family Cyprinidae

Cyprinella spiloptera **Cope, 1867**

Cyprinus Carpio **Linnaeus, 1758**

Luxilus chrysocephalus **Rafinesque, 1820**

Luxilus cornutus **Mitchill, 1817**

Nocomis biguttatus **Kirtland, 1840**

Nocomis micropogon **Cope, 1865**

Notropis heterodon **Cope, 1865**

Notropis photogenis **Cope, 1865**

Pimephales notatus **Rafinesque, 1820**

Rhinichthys atratulus **Hermann, 1804**

Semotilus atromaculatus **Mitchill, 1818**

Order Esociformes

Family Esocidae

Esox lucius **Linnaeus, 1758**

Order Gasterosteiformes

Family Gasterosteidae

Culaea inconstans **Kirtland, 1840**

Order Perciformes

Family Centrarchidae

Ambloplites rupestris **Rafinesque, 1817**

Lepomis gibbosus **Linnaeus, 1758**

Micropterus dolomieu **Lacepède, 1802**

Micropterus salmoides **Lacepède, 1802**

Pomoxis nigromaculatus **Lesueur in Cuvier and Valenciennes, 1829**

Family Percidae

Etheostoma blennioides **Rafinesque, 1819**

Etheostoma exile **Girard, 1859**

Etheostoma nigrum **Rafinesque, 1820**

Perca flavescens **Mitchill, 1814**

Percina maculata **Girard, 1859**

Order Salmoniformes

Family Salmonidae

Salvelinus fontinalis **Mitchill, 1814**

Order Siluriformes

Family Ictaluridae

***Ameiurus nebulosus* Lesueur, 1819**

***Noturus flavus* Rafinesque, 1818**

Class Amphibia

Order Anura

Family Bufonidae

***Anaxyrus americanus* Holbrook, 1836**

Family Hylidae

***Hyla versicolor* LeConte, 1825**

***Pseudacris crucifer* Wied-Neuwied, 1838**

***Pseudacris triseriata* Wied-Neuwied, 1838**

Family Ranidae

***Lithobates catesbeiana* Shaw, 1802**

***Lithobates clamitans* Latreille in Sonnini de Manoncourt and Latreille, 1801**

***Lithobates pipiens* Schreber, 1782**

***Lithobates sylvatica* LeConte, 1825**

Order Caudata

Family Ambystomidae

***Ambystoma jeffersonianum x laterale* var. *hybrid species: jefferson and blue-spotted* Green, 1827 and Hallowell, 1856**

***Ambystoma laterale* Hallowell, 1856**

***Ambystoma maculatum* Shaw, 1802**

Family Plethodontidae

***Hemidactylium scutatum* Temminck and Schlegel, 1838**

***Plethodon cinereus* Green, 1818**

Class Aves

Order Anseriformes

Family Anatidae

***Aix sponsa* Linnaeus, 1758**

***Anas acuta* Linnaeus, 1758**

***Anas americana* Gmelin, 1789**

***Anas clypeata* Linnaeus, 1758**

***Anas crecca* Linnaeus, 1758**

***Anas discors* Linnaeus, 1766**

***Anas platyrhynchos* Linnaeus, 1758**

Anas rubripes Brewster, 1902
Anas strepera Linnaeus, 1758
Aythya affinis Eyton, 1838
Aythya americana Eyton, 1838
Aythya collaris Donovan, 1809
Aythya marila Linnaeus, 1761
Aythya valisineria A. Wilson, 1814
Branta bernicla Linnaeus, 1758
Branta canadensis Linnaeus, 1758
Branta hutchinsii Richardson, 1832
Bucephala albeola Linnaeus, 1758
Bucephala clangula Linnaeus, 1758
Chen caerulescens Linnaeus, 1758
Clangula hyemalis Linnaeus, 1758
Cygnus buccinator Richardson, 1831
Cygnus columbianus Ord, 1815
Cygnus olor Gmelin, 1789
Lophodytes cucullatus Linnaeus, 1758
Melanerpes erythrocephalus Linnaeus, 1758
Mergus merganser Linnaeus, 1758
Mergus serrator Linnaeus, 1758
Oxyura jamaicensis Gmelin, 1789

Order Apodiformes

Family Apodidae

Chaetura pelagica Linnaeus, 1758

Family Trochilidae

Archilochus colubris Linnaeus, 1758

Order Caprimulgiformes

Family Caprimulgidae

Caprimulgus vociferus A. Wilson, 1812
Chordeiles minor J. R. Forster, 1771

Order Charadriiformes

Family Charadriidae

Charadrius semipalmatus Bonaparte, 1825
Charadrius vociferus Linnaeus, 1758

Family Laridae

***Chroicocephalus philadelphia* Ord, 1815**

***Larus delawarensis* Ord, 1815**

***Larus fuscus* Linnaeus, 1758**

***Larus glaucoides* B. Meyer, 1822**

***Larus hyperboreus* Gunnerus, 1767**

***Larus marinus* Linnaeus, 1758**

***Larus smithsonianus* Coues, 1862**

***Larus thayeri* W. S. Brooks, 1915**

***Mniotilta varia* Linnaeus, 1766**

***Sterna hirundo* Linnaeus, 1758**

Family Scolopacidae

***Actitis macularius* Linnaeus, 1766**

***Arenaria interpres* Linnaeus, 1758**

***Bartramia longicauda* Bechstein, 1812**

***Calidris alpina* Linnaeus, 1758**

***Calidris bairdii* Coues, 1861**

***Calidris melanotos* Vieillot, 1819**

***Calidris minutilla* Vieillot, 1819**

***Calidris pusilla* Linnaeus, 1766**

***Gallinago delicata* Ord, 1825**

***Scolopax minor* Gmelin, 1789**

***Tringa flavipes* Gmelin, 1789**

***Tringa melanoleuca* Gmelin, 1789**

***Tringa solitaria* A. Wilson, 1813**

Family Sternidae

***Hydroprogne caspia* Pallas, 1770**

Order Ciconiiformes

Family Ardeidae

***Ardea alba* Linnaeus, 1758**

***Ardea herodias* Linnaeus, 1758**

***Botaurus lentiginosus* Rackett, 1813**

***Butorides virescens* Linnaeus, 1758**

***Chlidonias niger* Linnaeus, 1758**

***Egretta caerulea* Linnaeus, 1758**

Order Columbiformes

Family Columbidae

Columba livia **Gmelin, 1789**

Zenaida macroura **(Linnaeus, 1758)**

Order Coraciiformes

Family Alcedinidae

Megaceryle alcyon **Linnaeus, 1758**

Order Cuculiformes

Family Cuculidae

Coccyzus americanus **Linnaeus, 1758**

Coccyzus erythropthalmus **A. Wilson, 1811**

Order Falconiformes

Family Accipitridae

Accipiter cooperii **Bonaparte, 1828**

Accipiter gentilis **Linnaeus, 1758**

Accipiter striatus **Vieillot, 1808**

Agelaius phoeniceus **Linnaeus, 1766**

Aquila chrysaetos **Linnaeus, 1758**

Buteo jamaicensis **Gmelin, 1788**

Buteo lagopus **Pontoppidan, 1763**

Buteo lineatus **Gmelin, 1788**

Buteo platypterus **Vieillot, 1823**

Circus cyaneus **Linnaeus, 1766**

Haliaeetus leucocephalus **Linnaeus, 1766**

Family Cathartidae

Cathartes aura **Linnaeus, 1758**

Family Falconidae

Falco columbarius **Linnaeus, 1758**

Falco peregrinus **Tunstall, 1771**

Falco sparverius **Linnaeus, 1758**

Family Pandionidae

Pandion haliaetus **Linnaeus, 1758**

Order Galliformes

Family Odontophoridae

Colinus virginianus **Linnaeus, 1758**

Family Phasianidae

***Bonasa umbellus* Linnaeus, 1766**

***Meleagris gallopavo* Linnaeus, 1758**

***Phasianus colchicus* Linnaeus, 1758**

Order Gaviiformes

Family Gaviidae

***Gavia immer* Brunnich, 1764**

Order Gruiformes

Family Gruidae

***Grus canadensis* Linnaeus, 1758**

Family Rallidae

***Fulica americana* Gmelin, 1789**

***Porzana carolina* Linnaeus, 1758**

***Rallus limicola* Vieillot, 1819**

Order Passeriformes

Family Alaudidae

***Eremophilia alpestris* (Linnaeus, 1758)**

Family Bombycillidae

***Bombycilla cedrorum* Vieillot, 1808**

Family Calcariidae

***Calcarius lapponicus* Linnaeus, 1758**

Family Cardinalidae

***Cardinalis cardinalis* Linnaeus, 1758**

***Passerina cyanea* Linnaeus, 1766**

***Pheucticus ludovicianus* Linnaeus, 1766**

***Plectrophenax nivalis* Linnaeus, 1758**

Family Certhiidae

***Certhia americana* Bonaparte, 1838**

Family Corvidae

***Corvus brachyrhynchos* C. L. Brehm, 1822**

***Corvus corax* Linnaeus, 1758**

***Cyanocitta cristata* Linnaeus, 1758**

Family Emberizidae

***Ammodramus leconteii* Audubon, 1844**

***Ammodramus nelsoni* Allen, 1875**

Ammodramus savannarum Gmelin, 1789
Junco hyemalis Linnaeus, 1758
Melospiza georgiana Latham, 1790
Melospiza lincolnii Audubon, 1834
Melospiza melodia A. Wilson, 1810
Passerculus sandwichensis Gmelin, 1789
Passerella iliaca Merrem, 1786
Pipilo erythrophthalmus Linnaeus, 1758
Pipilo maculatus Swainson, 1827
Pooecetes gramineus Gmelin, 1789
Spizella arborea A. Wilson, 1810
Spizella pallida Swainson, 1832
Spizella passerina Bechstein, 1798
Spizella pusilla A. Wilson, 1810
Zonotrichia albicollis Gmelin, 1789
Zonotrichia leucophrys J. R. Forster, 1772

Family Fringillidae

Carduelis flammea Linnaeus, 1758
Carduelis pinus A. Wilson, 1810
Carduelis tristis Linnaeus, 1758
Carpodacus mexicanus Statius Muller, 1776
Carpodacus purpureus Gmelin, 1789
Coccothraustes vespertinus W. Cooper, 1825
Loxia curvirostra Linnaeus, 1758

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The fifth of five checklists for Kingdom Animalia, this checklist contains records from Phylum Chordata, Class Aves (Orders Passeriformes to Strigiformes), Class Mammalia, and Class Reptilia, as well as Phylum Gastropoda.

Phylum Chordata
Class Aves
Order Passeriformes
Family Fringillidae
Loxia leucoptera **Gmelin 1789**
Family Hirundinidae
Hirundo rustica **Linnaeus, 1758**
Petrochelidon pyrrhonota **(Vieillot, 1817)**
Riparia riparia **Linnaeus, 1758**
Stelgidopteryx serripennis **Audubon, 1838**
Tachycineta bicolor **Vieillot, 1808**
Family Icteridae
Dolichonyx oryzivorus **Linnaeus, 1758**
Euphagus carolinus **Statius Muller, 1776**
Euphagus cyanocephalus **Wagler, 1829**
Icterus galbula **Linnaeus, 1758**
Icterus spurius **Linnaeus, 1766**
Molothrus ater **Boddaert, 1783**
Quiscalus quiscula **Linnaeus, 1758**
Sturnella magna **Linnaeus, 1758**
Xanthocephalus xanthocephalus **Bonaparte, 1826**
Family Laniidae
Lanius excubitor **Linnaeus, 1758**

Family Mimidae

Dumetella carolinensis **Linnaeus, 1766**

Mimus polyglottos **Linnaeus, 1758**

Toxostoma rufum **Linnaeus, 1758**

Family Motacillidae

Anthus rubescens **Tunstall, 1771**

Family Paridae

Poecile atricapillus **Linnaeus, 1766**

Family Parulidae

Cardellina canadensis **Linnaeus, 1766**

Cardellina pusilla **A. Wilson, 1811**

Geothlypis philadelphia **A. Wilson, 1810**

Geothlypis trichas **Linnaeus, 1766**

Leiothlypis celata **Say, 1822**

Leiothlypis peregrina **A. Wilson, 1811**

Leiothlypis ruficapilla **A. Wilson, 1811**

Oporornis agilis **A. Wilson, 1812**

Setophaga americana **Linnaeus, 1758**

Setophaga caerulescens **J. F. Gmelin, 1789**

Setophaga castanea **A. Wilson, 1810**

Setophaga citrina **Boddaert, 1783**

Setophaga coronata **Linnaeus, 1766**

Setophaga discolor **Vieillot, 1809**

Setophaga fusca **Statius Müller, 1776**

Setophaga magnolia **A. Wilson, 1811**

Setophaga palmarum **J. F. Gmelin, 1789**

Setophaga pensylvanica **Linnaeus, 1766**

Setophaga petechia **Linnaeus, 1766**

Setophaga pinus **Linnaeus, 1766**

Setophaga ruticilla **Linnaeus, 1758**

Setophaga striata **J. R. Forster, 1772**

Setophaga tigrina **J. F. Gmelin, 1789**

Setophaga virens **J. F. Gmelin, 1789**

Vermivora chrysoptera **Linnaeus, 1766**

Vermivora cyanoptera **Olson & Reveal, 2009**

Family Passeridae

Passer domesticus **Linnaeus, 1758**

Family Peucedramidae

Nycticorax nycticorax **Linnaeus, 1758**

Parkesia noveboracensis **J. F. Gmelin, 1789**

Picoides arcticus **Swainson, 1832**

Seiurus aurocapilla **Linnaeus, 1766**

Family Regulidae

Regulus calendula **(Linnaeus, 1766)**

Regulus satrapa **Lichtenstein 1823**

Family Sittidae

Sitta canadensis **Linnaeus, 1766**

Sitta carolinensis **Latham, 1790**

Family Sturnidae

Sturnus vulgaris **Linnaeus, 1758**

Family Sylviidae

Polioptila caerulea **Linnaeus, 1766**

Family Thraupidae

Piranga olivacea **Gmelin, 1789**

Family Troglodytidae

Cistothorus palustris **A. Wilson, 1810**

Thryothorus ludovicianus **(Latham, 1790)**

Troglodytes aedon **Vieillot, 1809**

Troglodytes hiemalis **Vieillot, 1819**

Family Turdidae

Catharus fuscescens **(Stephens, 1817)**

Catharus guttatus **Pallas, 1811**

Catharus minimus **Lafresnaye, 1848**

Catharus ustulatus **Nuttall, 1840**

Hylocichla mustelina **Gmelin, 1789**

Sialia sialis **Linnaeus, 1758**

Turdus migratorius **Linnaeus, 1766**

Family Tyrannidae

Contopus cooperi **Nuttall, 1831**

Contopus virens **Linnaeus, 1766**

Empidonax alnorum Brewster, 1895
Empidonax flaviventris W. M. Baird & S. F. Baird, 1843
Empidonax Minimus W. M. Baird & S. F. Baird, 1843
Empidonax traillii Audubon, 1828
Myiarchus crinitus Linnaeus, 1758
Sayornis phoebe Latham, 1790
Tyrannus tyrannus Linnaeus, 1758

Family Vireonidae
Vireo flavifrons Vieillot, 1808
Vireo gilvus Vieillot, 1808
Vireo griseus Boddaert, 1783
Vireo olivaceus Linnaeus, 1766
Vireo philadelphicus Cassin, 1851
Vireo solitarius A. Wilson, 1810

Order Pelecaniformes
Family Phalacrocoracidae
Phalacrocorax auritus Lesson, 1831

Order Piciformes
Family Picidae
Colaptes auratus Linnaeus, 1758
Dryocopus Pileatus Linnaeus, 1758
Melanerpes carolinus Linnaeus, 1758
Picoides pubescens Linnaeus, 1766
Picoides villosus Linnaeus, 1766
Sphyrapicus varius Linnaeus, 1766

Order Podicipediformes
Family Podicipedidae
Podiceps auritus Linnaeus, 1758
Podiceps grisegena Boddaert, 1783
Podilymbus podiceps Linnaeus, 1758

Order Strigiformes
Family Strigidae
Aegolius acadicus Gmelin, 1788
Asio flammeus Pontoppidan, 1763
Bubo virginianus Gmelin, 1788

Megascops asio **Linnaeus, 1758**

Strix varia **Barton, 1799**

Class Mammalia

Order Artiodactyla

Family Cervidae

Odocoileus virginianus **Zimmermann, 1780**

Order Carnivora

Family Canidae

Canis latrans **Say, 1823**

Vulpes vulpes **Linnaeus, 1758**

Family Felidae

Lynx rufus **Schreber, 1777**

Family Mephitidae

Mephitis mephitis **Schreber, 1776**

Family Mustelidae

Lontra canadensis **Schreber, 1777**

Mustela erminea **Linnaeus, 1758**

Neovison vison **Schreber, 1777**

Family Procyonidae

Procyon lotor **Linnaeus, 1758**

Order Chiroptera

Family Vespertilionidae

Eptesicus fuscus **Palisot de Beauvois, 1796**

Lasionycteris noctivagans **LeConte, 1831**

Lasiurus borealis **Müller, 1776**

Lasiurus cinereus **Palisot de Beauvois, 1796**

Myotis lucifugus **LeConte, 1831**

Myotis septentrionalis **Trouessart, 1897**

Order Didelphimorphia

Family Didelphidae

Didelphis virginiana **Kerr, 1792**

Order Lagomorpha

Family Leporidae

Lepus americanus **Erxleben, 1777**

Lepus europaeus **Pallas, 1778**

Sylvilagus floridanus J. A. Allen, 1890

Order Rodentia

Family Castoridae

Castor canadensis Kuhl, 1820

Family Cricetidae

Microtus pennsylvanicus Ord, 1815

Myodes gapperi Vigors, 1830

Ondatra zibethicus Linnaeus, 1766

Peromyscus leucopus Rafinesque, 1818

Peromyscus maniculatus Wagner, 1845

Family Dipodidae

Zapus hudsonius Zimmermann, 1780

Family Erethizontidae

Erethizon dorsatus Linnaeus, 1758

Family Muridae

Mus musculus Linnaeus, 1758

Rattus norvegicus Berkenhout, 1769

Family Sciuridae

Glaucomys sabrinus Shaw, 1801

Marmota monax Linnaeus, 1758

Sciurus carolinensis Gmelin, 1788

Tamias striatus Linnaeus, 1758

Tamiasciurus hudsonicus Erxleben, 1777

Order Soricomorpha

Family Soricidae

Blarina brevicauda Say, 1823

Sorex cinereus Kerr, 1792

Sorex fumeus G. M. Miller, 1895

Family Talpidae

Condylura cristata Linnaeus, 1758

Class Reptilia

Order Squamata

Family Colubridae

Lampropeltis triangulum subsp. *triangulum* (Lacépède, 1789)

Nerodia sipedon Linnaeus, 1758

Opheodrys vernalis Harlan, 1827
Regina septemvittata Say, 1825
Storeria dekayi Holbrook, 1839
Storeria occipitomaculata Storer, 1839
Thamnophis sauritus Linnaeus, 1766
Thamnophis sirtalis subsp. *sirtalis* (Linnaeus, 1758)
Order Testudines
Family Chelydridae
Chelydra serpentina Linnaeus, 1758
Family Emydidae
Chrysemys picta Schneider, 1783
Phylum Mollusca
Class Gastropoda
Family Discidae
Anguispira alternata Say, 1816
Family Pristilomatidae
Hawaiia minuscula A. Binney, 1841
Family Succineidae
Novisuccinea ovalis Say, 1817
Family Vertiginidae
Vertigo bollesiana E. S. Morse, 1865
Order Basommatophora
Family Planorbidae
Gyraulus circumstriatus Tryon, 1866
Order Hygrophila
Family Physidae
Physa gyrina Say, 1821
Order Pulmonata
Family Zonitidae
Paravitrea multidentata A. Binney, 1840
Order Stylommatophora
Family Agriolimacidae
Deroceras reticulatum Muller, 1774
Family Arionidae
Arion fuscus (O. F. Müller, 1774)

Arion subfuscus Draparnaud, 1805

Family Gastrodontidae

Oxychilus allarius (J. S. Miller, 1822)

Zonitoides arboreus Say, 1816

Notes: BOLD:AAN3419

Family Helicidae

Cepaea nemoralis Linnaeus, 1758

Cochlicopa lubrica (Muller, 1774)

Family Helicodiscidae

Helicodiscus parallelus Say, 1817

Family Hygromiidae

Trochulus hispidus (Linnaeus, 1758)

Notes: BOLD:ACI9420

Family Succineidae

Succinea putris Linnaeus, 1758

Family Vitrinidae

Vitrina angelicae Beck, 1837

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. This checklist contains members of Kingdom Amoebozoa, Phylum Mycetozoa.

Class Myxogastria

Order Liceales

Family Tubiferaceae

Lycogala epidendrum Linnaeus, 1829

Notes: / flavofuscum

Order Liceida

Family Reticulariaceae

Tubifera ferruginosa (Batsch) J.F. Gmel.

Order Stemonitida

Family Stemonitidae

***Stemonitis axifera* Bull, 1791**

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. This checklist contains records from Kingdom Fungi, including Phyla Ascomycota, Basidiomycota, and Zygomycota.

Phylum Ascomycota

***Dictyocatenulata alba* Finley & E. F. Morris 1967**

Phylum Ascomycota

Class Arthoniomycetes

Order Arthoniales

Family Arthoniaceae

***Arthonia caesia* Koerber, 1861**

***Arthonia caudata* Willey, 1892**

***Arthonia radiata* Vetensk-Akad, 1808**

Class Dothideomycetes

Order Pleosporales

Family Venturiaceae

***Apiosporina morbosa* Arx, 1954**

Order Polyporales

Family Fomitopsidaceae

***Ischnoderma resinosum* Schrader, 1794**

***Piptoporus betulinus* Bulliard, 1780**

***Postia caesia* Schrad, 1881**

Notes: (*Oligoporus caesius*)

***Postia fragilis* Jülich, 1982**

Family Ganodermataceae

***Ganoderma applanatum* Persoon, 1799**

***Ganoderma lucidum* Curtis 1791**

Notes: or Ganoderma tsugae

Family Meripilaceae

Gloeoporus dichrous **Fries, 1815**

Grifola frondosa **Dickson, 1785**

Family Meruliaceae

Bjerkandera adusta **Willdenow, 1787**

Climacodon septentrionale **Fries, 1821**

Phlebia radiata **Fries, 1821**

Porotheleum fimbriatum **Persoon, 1818**

Family Phanerochaetaceae

Steccherinum ochraceum **Persoon, 1792**

Family Polyporaceae

Cerrena unicolor **Bulliard, 1785**

Favolus alveolaris **De Candolle 1815**

Laetiporus sulphureus **Bulliard, 1780**

Lenzites betulina **Linnaeus, 1753**

Polyporus badius **Persoon, 1801**

Polyporus brumalis **Persoon, 1794**

Trametes elegans **Sprengel, 1820**

Trichaptum abietinum **Dickson, 1972**

Notes: (?)

Tyromyces chioneus **Fries, 1815**

Notes: (Tyromyces albellus, Polyorus albellus

Family Steccherinaceae

Irpex lacteus **Fries, 1818**

Class Eurotiomycetes

Order Mycocaliciales

Family Mycocaliciaceae

Mycocalicium subtile **Persoon, 1925**

Phaeocalicium curtisii **Tuckerman, 1975**

Order Verrucariales

Family Verrucariaceae

Verrucaria calkinsiana **Servít, 1950**

Class Lecanoromycetes

Order Baeomycetales

Family Trapeliaceae

Trapelia involuta **(Taylor) Hertel**

Trapelia placodioides **Coppins & P. James**

Order Candelariales

Family Candelariaceae

Candelaria concolor **(Dicks.) Stein**

Candelariella aurella **(Hoffm.) Zahlbr.**

Candelariella efflorescens **R.C. Harris & W.R. Buck**

Order Lecanorales

Family Acarosporaceae

Acarospora glaucocarpa **(Ach.) Körb.**

Family Cladoniaceae

Cladonia ochrochlora **Flörke**

Family Lecanoraceae

Lecanora allophana **(Ach.) Nyl. 1872**

Notes: f. sorediata

Lecanora allophana f. sorediata

Lecanora pulicaris **(Pers.) Ach.**

Lecanora sambuci **(Pers.) Nyl.**

Lecanora symmicta **(Ach.) Ach.**

Lecanora thysanophora **R. C. Harris**

Lecidella carpathica **Körb.**

Family Parmeliaceae

Flavoparmelia caperata **(Linnaeus) Hale (1986)**

Flavopunctelia flaventior **(Stirt.) Hale**

Melanelixia subaurifera **(Nyl.) O. Blanco et al.**

Parmelia squarrosa **Hale**

Parmelia sulcata **Taylor**

Punctelia rudecta **(Ach.) Krog**

Punctelia subrudecta **(Nyl.) Krog**

Xanthoparmelia cumberlandia **(Gyeln.) Hale, 1974**

Family Peltigeraceae

Peltigera evansiana **Gyelnik**

Peltigera rufescens **(Weiss) Humb.**

Family Porpidiaceae

Bilimbia sabuletorum **(Schreb.) Arnold**

Family Psoraceae

Protoblastenia rupestris **(Scop.) J. Steiner**

Psora decipiens **(Hedwig) Hoffm.**

Family Ramalinaceae

Bacidia schweinitzii **(Fr. ex E. Michener) A. Schneider**

Lecania croatica **(Zahlbr.) Kotlov**

Lecania naegelii **(Hepp) Diederich & v. d. Boom**

Family Stereocaulaceae

Lepraria incana **(Linnaeus) Ach.**

Lepraria lobificans **Nyl.**

Order Lecanoromycetes

Family Thelenellaceae

Julella fallaciosa **(Arnold) R. C. Harris**

Order Ostropales

Family Coenogoniaceae

Coenogonium pineti **(Ach.) Lücking & Lumbsch, 2004**

Family Graphidaceae

Graphis scripta **(Linnaeus) Ach. (1809)**

Family Phlyctidaceae

Phlyctis **spp.**

Family Stictidaceae

Conotrema urceolatum **(Ach.) Gilenstam 2005**

Order Teloschistales

Family Physciaceae

Buellia punctata **(Hoffm.) A. Massal.**

Buellia stillingiana **J. Steiner 1919**

Hyperphyscia adglutinata **(Flörke) H. Mayrhofer & Poelt**

Phaeophyscia adiastola **(Essl.) Essl. 1978**

Phaeophyscia orbicularis **(Neck.) Moberg**

Phaeophyscia pusilloides **(Zahlbr.) Essl. 1978**

Phaeophyscia rubropulchra (Degel.) Moberg 1978

Physcia adscendens (Th. Fr.) H. Olivier

Physcia aipolia (Ehrh. ex Humb.) Fürnr.

Physcia millegrana Degel.

Physcia stellaris (Linnaeus) Nyl.

Physciella chloantha (Ach.) Essl.

Physconia detersa (Nyl.) Poelt

Family Teloschistaceae

Caloplaca flavovirescens (Wulfen) Søchting, Frödén & Arup

Caloplaca pyracea (Ach.) Zwackh

Xanthomendoza fallax (Hepp ex Arn.) Soechting, KSrnefelt & S. Kondratyuk

Xanthomendoza ulophyllodes (RSsSnen) Soechting, KSrnefelt & S. Kondratyuk

Xanthoria parietina (Linnaeus) Th. Fr.

Class Leotiomycetes

Order Helotiales

Family Bulgariaceae

Bulgaria inquinans (Pers.) Fr. (1822)

Family Helotiaceae

Ascocoryne cylichnium (Tul.) Korf 1971

Bisporella citrina (Batsch) Korf & S.E.Carp. (1974)

Chlorociboria aeruginascens (Nyl.) Kanouse 1947

Family Hemiphacidiaceae

Chlorencoelia versiformis (Pers.) J.R.Dixon (1975)

Class Pezizomycetes

Order Pezizales

Family Pezizaceae

Peziza repanda Pers. (1808)

Family Pyronemataceae

Aleuria aurantia (Pers.) Fuckel, 1870

Jafnea semitosta (Berk. & M.A. Curtis) Korf

Scutellinia scutellata (Linnaeus) Lambotte 1887

Scutellinia setosa Nees) Kuntze (1891)

Notes: /erinaceous

Tarzetta cupularis **(Linnaeus) Svrček (1981)**

Class Sordariomycetes

Order Hypocreales

Family Bionectriaceae

Ovicuculispora parmeliae **(Berk. & Curt.) Etayo**

Family Hypocreaceae

Hypomyces lactifluorum **(Schwein.) Tul. & C. Tul. 1860**

Order Xylariales

Family Xylariaceae

Daldinia concentrica **(Bolton) Ces. & De Not. 1863**

Hypoxylon fragiforme **(Pers.) J. Kickx f. 1835**

Ustulina deusta **(Hoffm.) P.M.D. Martin, (1970)**

Notes: (?)

Xylaria longipes **Nitschke 1867**

Xylaria polymorpha **(Pers.) Grev. 1824**

Phylum Basidiomycota

Class Agaricomycetes

Order Agaricales

Family Agaricaceae

Agaricus arvensis **Schaeff. 1774**

Agaricus placomyces **Peck 1878**

Calvatia gigantea **(Batsch) Lloyd 1904**

Coprinus comatus **(O.F. Müll.) Pers. 1797**

Lepiota clypeolaria **(Bull.) P. Kumm. 1871**

Lepiota cristata **Barla**

Leucoagaricus naucinus **Wasser, 1977**

Notes: (*Lepiota naucina*)

Lycoperdon perlatum **Persoon,1796**

Notes: (*Lycoperdon gemmatum*)

Parasola plicatilis **(Curtis) Redhead, Vilgalys & Hopple 2001**

Family Amanitaceae

Amanita bisporigera **G.F.Atk., 1906**

Family Bolbitiaceae

***Conocybe rugosa* (Peck) Watling, 1981**

***Panaeolus foenisecii* R.Maire, 1933**

Notes: (*Panaeolina foenisecii*)

Family Cortinariaceae

***Gymnopilus spectabilis* (Fr.) A. H. Smith**

Notes: (*Gymnopilus junonius*)

***Phaeomarasmius proximans* Singer, 1989**

Family Entolomataceae

***Clitopilus prunulus* P. Kumm., 1871**

***Clitopilus scyphoides* Singer, 1946**

***Entoloma abortivum* Donk, 1949**

***Entoloma* spp.**

***Entoloma strictus* Hesler (1967)**

Notes: (*Nolanea strictia*)

***Leptonia incana* Gillet, ?**

Notes: Or euchlora

Family Hygrophoraceae

***Arrhenia epichysium* (Pers.) Redhead, Lutzoni, Moncalvo & Vilgalys 2002**

***Hygrocybe coccinea* P. Kumm, 1871**

***Hygrocybe flavescens* Singer, 1951**

***Hygrocybe miniata* P. Kumm, 1871**

***Hygrocybe pratensis* Murrill, 1914**

Notes: (*Camarophyllus pratensis*)

***Hygrocybe punicea* P. Kumm, 1871**

***Hygrocybe virginea* P.D. Orton & Watling, 1969**

***Hygrophorus eburneus* Fries, 1838**

Family Hymenogastraceae

***Galerina autumnalis* (Peck) A.H. Sm. & Singer**

Notes: (*Galerina marginata*)

***Hebeloma crustuliniforme* Bulliard, 1787**

Family Inocybaceae

***Crepidotus applanatus* Persoon, 1796**

Crepidotus mollis **Staude, 1857**

Inocybe rimosa **Bulliard, 1789**

Inocybe **spp.**

Crepidotus crocophyllus **Berkeley, 1847**

Family Lycoperdaceae

Lycoperdon pyriforme **Schaeffer, 1774**

Family Lyophyllaceae

Lyophyllum decastes **Fries, 1818**

Family Marasmiaceae

Baeospora myosura **Fries, 1818**

Clitocybula oculus **Peck, 1878**

Marasmius rotula **Scopoli, 1772**

Micromphale foetidum **(Sowerby) Singer, 1949**

Pleurocybella porrigens **(Pers.) Singer, 1947**

Notes: / *Phylotus porrigens*

Rhodocollybia butryacea **(Bulliard, 1792) Lennox, 1979**

Notes: (*Collybia butryacea*)

Gymnopus acervatus **Fries, 1821**

Notes: / *Connopus acervatus*

Xerula furfuracea **(Peck, 1893) R. H. Petersen, 2010**

Family Mycenaceae

Mycena galericulata **(Scop.) Gray (1821)**

Mycena haematopus **(Pers.) P.Kummmer, 1871**

Mycena inclinata **(Fr.) Quél.,1872**

Mycena leaiana **(Berk.) Saccardo,1891**

Mycena olida **Bresadola,1887**

Mycena osmundicola **J. E. Lange, 1914**

Mycena **spp.**

Panellus stipticus **(Bull.) P.Karst. (1879)**

Xeromphalina kauffmanii **A. H. Smith, 1953**

Family Physalacriaceae

Armillaria gallica **Marxmüller & Romagnesi, 1987**

Armillaria mellea complex **(Vahl, 1790) Kummer, 1871**

Armillaria ostoyae **(Romagnesi, 1970) Herink, 1973**

Flammulina velutipes **(Curtis, 1782) Singer, 1951**

Hymenopellis limonispora **R.H. Petersen, 2010**

Xerula megalospora **(Clements, 1896) R. H. Petersen, 2010**

Family Pleurotaceae

Pleurotus ostreatus **(Jacquin) Kummer, 1871**

Family Pluteaceae

Pluteus atricapillus **(Schaeffer) Kummer, 1871**

Pluteus atromarginatus **(Konrad, 1927) Kühner, 1935**

Pluteus cervinus **(Schaeffer, 1774) Kummer, 1871**

Notes: (*Pluteus atricapillus*)

Pluteus hongoi **Singer, 1989**

Pluteus longistriatus **Peck, 1885**

Pluteus umbrosus **(Pers.) P. Kummer, 1871**

Notes: (*Pluteus granularis*)

Family Psathyrellaceae

Coprinellus micaceus **(Bull.:Fr.) Vilgalys, Hopple & Jacq. Johnson**

Coprinopsis atramentaria **(Bull.) Redhead, Vilgalys & Moncalvo (2001)**

Coprinus disseminatus **(Pers.) J.E.Lange (1938)**

Psathyrella candolleana **(Fr.) Maire, 1937**

Family Schizophyllaceae

Schizophyllum commune **Fries, 1815**

Family Strophariaceae

Agrocybe praecox **(Pers.) Fayod**

Gymnopilus penetrans **(Fr.) Maire**

Gymnopolis sapineus **(Fr.) Maire**

Hypholoma capnoides **(Fr.) P. Kummer, 1871**

Hypholoma fasciculare **(Huds.:Fr.) P. Kummer**

Hypholoma sublateritium **(Fr.) Quélet**

Pholiota aurivella **(Batsch) P.Kumm. (1871)**

Pholiota squarrosa **(Batsch) Kummer, 1871**

Pholiota squarrosoides **(Peck, 1879) Saccardo, 1887**

Family Tricholomataceae

Clitocybe ectypoides (Pk) Sacc.

Clitocybe gibba (Persoon, 1801) Harmaja, 2003

Collybia cookei (Bres.) J.D.Arnold (1935)

Hygrophorus langei (Kühner) A. Pearson, 1952

Notes: (?)

Hypsizygus tessulatus (Bull:Fr) Singer

Lepista irina (Fr.) H.E. Bigelow 1959

Lepista nuda (Bull.) Cooke 1871

Notes: (*Clitocybe nuda*)

Omphalina spp.

Phyllotopsis nidulans (Pers.) Singer 1936

Rhodotus palmatus (Bull.) Maire 1926

Tricholoma aurantium (Schaeff.) Ricken 1914

Tricholoma myomyces (Schaeff.) P. Kumm. 1871

Tricholoma terreum (P.Kumm., 1871)

Tricholoma virgatum (P.Kumm., 1871)

Xeromphalina cauticinalis (Kühner & Maire, 1934)

Panellus serotinus (Kühner,1950)

Family Clavariaceae

Multiclavula mucida (R.H. Peterson, 1967)

Order Boletales

Family Boletaceae

Boletinellus merulioides (Schwein.) Murrill 1909

Leccinum scabrum Gray 1821

Family Sclerodermataceae

Scleroderma areolatum Ehrenberg, 1818

Scleroderma citrinum Persoon, 1801

Scleroderma michiganense (Guzmán) Guzmán 1970

Family Suillaceae

Suillus americanus (Peck) Snell (1959)

Suillus brevipes (Peck) Kuntze 1898

Suillus granulatus (Linnaeus) Roussel 1796

Suillus luteus (Linnaeus) Roussel 1796

Order Cantharellales

Family Cantharellaceae

***Craterellus fallax* Smith 1968**

Order Corticiales

Family Corticiaceae

***Phlebia tremellosa* (Schrader) Nakasone & Burdsall, 1984**

Order Geastrales

Family Geastraceae

***Geastrum fimbriatum* Fries 1829**

***Geastrum quadrifidum* Persoon, 1794**

Order Gomphales

Family Gomphaceae

***Ramaria* spp.**

***Ramaria stricta* var. *concolor* (Persoon) Quélet 1888**

Order Hymenochaetales

Family Hymenochaetaceae

***Phellinus igniarius* (Linnaeus) Quélet 1886**

Order Phallales

Family Phallaceae

***Phallus duplicatus* Bosc (1811)**

***Phallus impudicus* Linnaeus 1753**

***Phallus ravenelii* Berkeley & M.A.Curtis (1873)**

Order Polyporales

Family Meruliaceae

***Loweomyces fractipes* (Berkeley & M.A. Curtis) Jülich 1982**

Family Polyporaceae

***Daedaleopsis confragosa* (Bolton) J. Schröter 1888**

***Fomes fomentarius* (Linnaeus) J. Kickx, 1867**

***Polyporus radicatus* Schweinitz, 1832.**

***Polyporus squamosus* (Hudson) Fries 1821**

***Polyporus varius* (Persoon) Fries 1821**

***Trametes gibbosa* (Persoon) Fries 1836**

***Trametes pubescens* (Schumacher) Pilát, 1939.**

***Trametes versicolor* (Linnaeus) Lloyd 1921**

Trichaptum biforme **(Fries) Ryvarden, 1972**

Truncospora ohiensis **(Berkeley) Pilát 1953**

Order Russulales

Family Hericiaceae

Hericium americanum **Ginns 1984**

Hericium coralloides **(Scopoli) Persoon, 1794**

Hericium erinaceus **(Bulliard) Persoon, 1797.**

Family Russulaceae

Lactarius torminosus **(Schaeffer) Gray 1821**

Russula rosacea **(Persoon) Gray 1821**

Russula **spp.**

Family Stereaceae

Stereum ostrea **(Blume & Nees) Fries, 1838.**

Stereum rugosum **Persoon 1794**

Stereum striatum **(Fries) Fries 1838**

Family Auriscalpiaceae

Lentinellus ursinus **(Fries) Kühner 1926**

Order Thelephorales

Family Bankeraceae

Boletopsis subsquamosa **(Linnaeus) Kotl.& Pouz.**

Class Basidiomycetes

Order Cortinariales

Family Cortinariaceae

Inocybe geophylla **var.** ***geophylla*** **(Persoon) Kummer, 1871**

Class Dacrymycetes

Order Dacrymycetales

Family Dacrymycetaceae

Calocera cornea **(Batsch) Fries, 1827.**

Class Tremellomycetes

Order Tremellales

Family Exidiaceae

Exidia alba **Lloyd) Burt 1921**

Notes: / *Ductifera pululahuana*

Exidia glandulosa (Bulliard) Fries (1822)
Family Tremellaceae
Tremella foliacea Persoon (1800)
Tremella reticulate (Berkeley) Farl. (1908)
Class Ustilaginomycetes
Order Ustilaginales
Family Ustilaginaceae
Ustilago maydis (DC.) Corda
Phylum Zygomycota
Class Zygomycetes
Order Mortierellales
Family Mortierellaceae
Mortierella hyalina (Harz) W. Gams

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The first of two checklists for Kingdom Plantae, this checklist contains records from Phyla Bryophyta, Equisetophyta, Lycopodiophyta and Magnoliophyta (Class Liliopsida and Magnoliopsida).

Kingdom Plantae
Phylum Bryophyta
Class Bryopsida
Order Bryales
Family Bryaceae
Bryum caespiticium Hedw.
Bryum argenteum Hedw.
Family Mniaceae
Mnium marginatum (With.) Brid. ex P. Beauv.

Family Plagiomniaceae

Plagiomnium cuspidatum **(Hedw.) T. Kop.**

Order Dicranales

Family Dicranaceae

Dicranum flagellare **Hedw.**

Dicranum montanum **Hedw.**

Family Ditrichaceae

Ceratodon purpureus **(Hedw.) Brid.**

Ditrichum **spp.**

Family Fissidentaceae

Fissidens adianthoides **Hedw.**

Fissidens taxifolius **Hedw.**

Fissidens **spp.**

Family Leucobryaceae

Leucobryum glaucum **(Hedw.) Ångstr. in Fries**

Order Encalyptales

Family Encalyptaceae

Encalypta procera **Bruch**

Order Grimmiales

Family Grimmiaceae

Schistidium apocarpa **(Hedw.) Bsg**

Schistidium rivulare **(Brid.) Podp.**

Order Hedwigiales

Family Hedwigiaceae

Hedwigia ciliata **(Hedw.) P. Beauv.**

Order Hypnales

Family Amblystegiaceae

Amblystegium serpens **(Hedw.) Schimp. in B.S.G.**

Amblystegium varium **(Hedw.) Lindb.**

Campylium chrysophyllum **(Brid.) J. Lange**

Campylium hispidulum **(Brid.) Mitt.**

Campylium **spp.**

Hygroamblystegium fluviatile **(Hedw.) Loeske**

Hygroamblystegium tenax **(Hedw.) Jenn.**

Leptodictyum riparium **(Hedw.) Warnst.**

Drepanocladus aduncus (Hedw.) Warnst.

Family Anomodontaceae

Anomodon attenuatus (Hedw.) Hüb.

Anomodon rostratus (Hedw.) Schimp.

Family Brachytheciaceae

Brachythecium spp.

Cirriphyllum piliferum (Hedw.) Grout

Eurhynchium hians (Hedw.) Sande Lac.

Eurhynchium pulchellum (Hedw.) Jenn.

Family Climaciaceae

Climacium americanum Brid.

Climacium dendroides (Hedw.) Web. & Mohr

Family Entodontaceae

Entodon seductrix (Hedw.) C. Müll.

Family Fontinalaceae

Fontinalis hypnoides Hartm.

Family Hylocomiaceae

Rhytidiadelphus triquetrus (Hedw.) Warnst.

Family Hypnaceae

Callicladium haldanianum (Grev.) Crum

Homomallium adnatum (Hedw.) Broth.

Hypnum curvifolium Hedw.

Hypnum imponens Hedw.

Hypnum lindbergii Mitt.

Hypnum spp.

Platydictya subtilis (Hedw.) Crum

Taxiphyllum deplanatum (Bruch & Schimp. ex Sull.) Fleisch.

Family Leskeaceae

Leskea polycarpa Hedw.

Leskeella nervosa (Brid.) Loeske

Family Plagiotheciaceae

Isopterygiopsis muelleriana (Schimp.) Iwats.

Family Thuidiaceae

Thuidium recognitum (Hedw.) Lindb.

Thuidium delicatulum (Hedw.) Schimp. in B.S.G.

Order Orthotrichales
Family Orthotrichaceae
Orthotrichum anomalum **Hedw.**
Order Pottiales
Family Pottiaceae
Barbula convoluta **Hedw.**
Desmatodon obtusifolius **(Schwaegr.) Schimp.**
Hymenostylium recurvirostre **(Hedw.) Dix.**
Tortella tortuosa **(Hedw.) Limpr.**
Barbula unguiculata **Hedw.**
Tortula ruralis **(Hedw.) Gaertn. et al.**
Weissia **spp.**
Order Splachnales
Family Meesiaceae
Leptobryum pyriforme **(Hedw.) Wils.**
Class Polytrichopsida
Order Polytrichales
Family Polytrichaceae
Atrichum angustatum **(Brid.) Bruch & Schimp. in B.S.G.**
Atrichum undulatum **(Hedw.) P. Beauv.**
Polytrichum **spp.**
Class Sphagnopsida
Order Sphagnales
Family Sphagnaceae
Sphagnum **spp.**
Class Tetraphidopsida
Order Tetraphidales
Family Tetraphidaceae
Tetraphis pellucida **Hedw.**
Phylum Equisetophyta
Class Equisetopsida
Order Equisetales
Family Equisetaceae
Equisetum arvense **Linnaeus**
Equisetum hyemale **subsp.** ***affine*** **(Engelm.) Calder & Roy L. Taylor**

Equisetum palustre Linnaeus

Equisetum pratense Ehrh.

Equisetum scirpoides Michx.

Equisetum sylvaticum Linnaeus

Equisetum variegatum subsp. *variegatum* Schleich. ex F. Weber & D. Mohr

Phylum Lycopodiophyta

Class Lycopodiopsida

Family Huperziaceae

Family Huperziaceae

Huperzia lucidula (Michx.) Trevis.

Order Lycopodiales

Family Lycopodiaceae

Lycopodiella inundata (Linnaeus) Holub

Lycopodium annotinum Linnaeus

Lycopodium obscurum Linnaeus

Lycopodium ssp.

Order Selaginellales

Order Selaginellales

Family Selaginellaceae

Selaginella eclipes W.R. Buck

Phylum Magnoliophyta

Class Liliopsida

Order Alismatales

Family Alismataceae

Sagittaria latifolia Willd.

Sagittaria rigida Pursh

Family Araceae

Arisaema triphyllum (Linnaeus) Schott

Symplocarpus foetidus (Linnaeus) Salisb. ex Nutt.

Family Butomaceae

Butomus umbellatus Linnaeus

Family Potamogetonaceae

Potamogeton crispus Linnaeus

Stuckenia pectinata (Linnaeus) Börner

Family Tofieldiaceae

Triantha glutinosa (Michx.) Baker

Order Arales

Family Araceae

Calla palustris Linnaeus

Lemna minor Linnaeus

Wolffia borealis (Engelm. ex Hegelm.) Landolt

Wolffia columbiana H. Karst.

Order Asparagales

Family Amarylilidaceae

Allium tricoccum Aiton

Family Asparagaceae

Asparagus officinalis Linnaeus

Convallaria majalis Linnaeus

Maianthemum canadense Desf.

Maianthemum racemosum subsp. *racemosum* (Linnaeus) Link

Maianthemum stellatum (Linnaeus) Link

Family Iridaceae

Iris pseudacorus Linnaeus

Family Orchidaceae

Cypripedium acaule Aiton

Cypripedium arietinum R. Br.

Cypripedium parviflorum var. *pubescens* (Willd.) O.W. Knight

Cypripedium reginae Walter

Order Cyperales

Family Cyperaceae

Carex albursina E. Sheld.

Carex aquatilis Wahlenb.

Carex arctata Boott ex Hook.

Carex atherodes Spreng.

Carex backii Boott

Carex bebbii Olney ex Fernald

Carex blanda Dewey

Carex bromoides Schkuhr ex Willd.

Carex chordorrhiza Ehrh. ex L. f.

Carex comosa **Boott**
Carex crinita **Lam.**
Carex cristatella **Britton**
Carex deweyana **Schwein.**
Carex diandra **Schrank**
Carex disperma **Dewey**
Carex eburnea **Boott**
Carex foenea **Willd.**
Carex formosa **Dewey**
Carex glaucodea **Tuck. ex Olney**
Carex gracillima **Schwein.**
Carex granularis **Muhl. ex Willd.**
Carex grisea **Wahlenb.**
Carex hirtifolia **Mack.**
Carex hitchcockiana **Dewey**
Carex hystericina **Muhl. ex Willd.**
Carex intumescens **Rudge**
Carex jamesii **Schwein.**
Carex lacustris **Willd.**
Carex laevivaginata **(Kük.) Mack.**
Carex lasiocarpa **Ehrh.**
Carex laxiculmis **Schwein.**
Carex laxiflora **Lam.**
Carex leptalea **Wahlenb.**
Carex livida **(Wahlenb.) Willd.**
Carex lupuliformis **Sartwell ex Dewey**
Carex lupulina **Muhl. ex Willd.**
Carex normalis **Mack.**
Carex peckii **Howe**
Carex pedunculata **Muhl. ex Willd.**
Carex pensylvanica **Lam.**
Carex plantaginea **Lam.**
Carex platyphylla **J. Carey**
Carex projecta **Mack.**
Carex pseudocyperus **Linnaeus**

Carex retrorsa **Schwein.**
Carex rosea **Schkuhr ex Willd.**
Carex scabrata **Schwein.**
Carex schweinitzii **Dewey ex Schwein.**
Carex scoparia **Schkuhr ex Willd.**
Carex sparganioides **Muhl. ex Willd.**
Carex **spp.**
Carex stipata **Muhl. ex Willd.**
Carex stricta **Lam.**
Carex tetanica **Schkuhr**
Carex tonsa **var.** ***rugosperma*** **(Mack.) Crins**
Carex trichocarpa **Muhl. ex Willd.**
Carex trisperma **Dewey**
Carex utriculata **Boott**
Carex vulpinoidea **Michx.**
Carex woodii **Dewey**
Cyperus bipartitus **Torr.**
Cyperus esculentus **Linnaeus**
Dulichium arundinaceum **(Linnaeus) Britton**
Eleocharis acicularis **(Linnaeus) Roem. & Schult.**
Eleocharis intermedia **Schult.**
Eriophorum virginicum **Linnaeus**
Eriophorum viridicarinatum **(Engelm.) Fernald**
Schoenoplectiella smithii **var.** ***smithii*** **(A. Gray) Hayasaka**
Schoenoplectus tabernaemontani **(C.C. Gmel.) Palla**
Scirpus atrovirens **Willd.**
Scirpus cyperinus **(Linnaeus) Kunth**

Order Juncales

Family Juncaceae

Juniperus virginiana **Linnaeus**
Luzula acuminata **Raf.**
Luzula multiflora **subsp.** ***multiflora*** **(Ehrh.) Lej.**

Order Liliales

Family Iridaceae

Iris **spp.**

Iris versicolor Linnaeus
Sisyrinchium angustifolium Mill.
Sisyrinchium montanum Greene
Sisyrinchium mucronatum Michx.
Family Liliaceae
Clintonia borealis (Aiton) Raf.
Erythronium albidum Nutt.
Erythronium americanum subsp. *americanum* Ker Gawl.
Hemerocallis fulva (Linnaeus) L.
Hemerocallis lilioasphodelus Linnaeus
Lilium canadense Linnaeus
Lilium michiganense Farw.
Lilium philadelphicum Linnaeus
Lilium superbum Linnaeus
Medeola virginiana Linnaeus
Polygonatum biflorum (Walter) Elliott
Polygonatum pubescens (Willd.) Pursh
Streptopus lanceolatus var. *lanceolatus* (Aiton) Reveal
Trillium erectum Linnaeus
Trillium grandiflorum (Michx.) Salisb.
Trillium spp.
Uvularia grandiflora Sm.
Family Melanthiaceae
Anticlea elegans var. *glaucus* (Nutt.) Zomlefer & Judd
Family Smilacaceae
Smilax herbacea Linnaeus
Smilax tamnoides Linnaeus
Order Najadales
Family Najadaceae
Najas flexilis (Willd.) Rostk. & W.L.E. Schmidt
Family Potamogetonaceae
Potamogeton amplifolius Tuck.
Potamogeton pusillus subsp. *pusillus* Linnaeus
Order Orchidales
Family Orchidaceae

Aplectrum hyemale (Muhl. ex Willd.) Torr.
Epipactis helleborine (Linnaeus) Crantz
Galearis spectabilis (Linnaeus) Raf.
Liparis loeselii (Linnaeus) Rich.
Platanthera dilatata (Pursh) Lindl. ex L.C. Beck
Platanthera hyperborea (Linnaeus) Lindl.
Platanthera nivea (Nutt.) Luer
Spiranthes lucida (H.H. Eaton) Ames

Order Poales

Family Juncaceae

Juncus acuminatus Michx.
Juncus articulatus Linnaeus
Juncus brachycarpus Engelm.
Juncus bufonius Linnaeus
Juncus dudleyi Wiegand
Juncus effusus Linnaeus
Juncus nodosus Linnaeus
Juncus tenuis Willd.

Family Poaceae

Agrostis capillaris Linnaeus
Agrostis gigantea Roth
Agrostis stolonifera Linnaeus
Alopecurus aequalis Sobol.
Andropogon gerardii Vitman
Avena fatua Linnaeus
Avena sativa Linnaeus
Brachyelytrum erectum (Schreb.) P. Beauv.
Briza maxima Linnaeus
Bromus ciliatus Linnaeus
Bromus latiglumis (Scribn. ex Shear) Hitchc.
Bromus pubescens Muhl. ex Willd.
Calamagrostis canadensis (Michx.) P. Beauv.
Cinna arundinacea Linnaeus
Dactylis glomerata Linnaeus
Danthonia spicata (Linnaeus) P. Beauv. ex Roem. & Schult.

Dichanthelium dichotomum **var. *dichotomum* (Linnaeus) Gould**

Dichanthelium latifolium **(Linnaeus) Harvill**

Dichanthelium linearifolium **(Scribn.) Gould**

Digitaria sanguinalis **(Linnaeus) Scop.**

Eleusine indica **(Linnaeus) Gaertn.**

Elymus canadensis **Linnaeus**

Elymus hystrix **Linnaeus**

Elymus lanceolatus **subsp. *psammophilus* (J.M. Gillett & H. Senn) Á. Löve**

Elymus repens **(Linnaeus) Gould**

Elymus riparius **Wiegand**

Elymus virginicus **var. *virginicus* Linnaeus**

Festuca rubra **subsp. *rubra* Linnaeus**

Glyceria borealis **(Nash) Batch.**

Glyceria canadensis **(Michx.) Trin.**

Glyceria maxima **(Hartm.) Holmb.**

Glyceria septentrionalis **Hitchc.**

Glyceria striata **(Lam.) Hitchc.**

Leersia oryzoides **(Linnaeus) Sw.**

Lolium perenne **Linnaeus**

Milium effusum **Linnaeus**

Muhlenbergia glomerata **(Willd.) Trin.**

Muhlenbergia mexicana **var. *mexicana* (Linnaeus) Trin.**

Muhlenbergia tenuiflora **(Willd.) Britton, Sterns & Poggenb.**

Oryzopsis asperifolia **Michx.**

Panicum capillare **Linnaeus**

Panicum virgatum **Linnaeus**

Patis racemosa **(Smith) Romaschenko, P.M. Peterson & Soreng**

Phalaris arundinacea **Linnaeus**

Poa compressa **Linnaeus**

Poa nemoralis **Linnaeus**

Poa pratensis **subsp. *pratensis* Linnaeus**

Poa ssp.

Schizachne purpurascens **(Torr.) Swallen**

Schizachyrium scoparium **(Michx.) Nash**

Setaria viridis (Linnaeus) P. Beauv.
Sorghastrum nutans (Linnaeus) Nash
Sporobolus vaginiflorus (Torr. ex A. Gray) Alph. Wood
Bromus inermis Leysser
Bromus kalmii A. Gray
Echinochloa crus-galli (Linnaeus) P. Beauv.
Phleum pratense Linnaeus
Phragmites australis (Cav.) Trin. ex Steud.
Setaria pumila (Poir.) Roem. & Schult.
Spartina pectinata Link
Family Typhaceae
Typha angustifolia Linnaeus
Typha latifolia Linnaeus
Order Typhales
Family Sparganiaceae
Sparganium americanum Nutt.
Sparganium eurycarpum Engelm.
Class Magnoliopsida
Order Apiales
Family Apiaceae
Aegopodium podagraria Linnaeus
Angelica atropurpurea Linnaeus
Cicuta bulbifera Linnaeus
Cicuta maculata Linnaeus
Conioselinum chinense (Linnaeus) Britton, Sterns & Poggenb.
Cryptotaenia canadensis (Linnaeus) DC.
Daucus carota Linnaeus
Erigenia bulbosa (Michx.) Nutt.
Heracleum mantegazzianum Sommier & Levier
Osmorhiza claytonii (Michx.) C.B. Clarke
Sanicula canadensis var. *grandis* Fernald
Sanicula marilandica Linnaeus
Sium suave Walter
Thaspium trifoliatum var. *aureum* (Linnaeus) Britton
Zizia aurea (Linnaeus) W.D.J. Koch

Family Araliaceae

***Aralia elata* (Miq.) Seem.**

***Aralia nudicaulis* Linnaeus**

***Aralia racemosa* subsp. *racemosa* Linnaeus**

***Hydrocotyle americana* Linnaeus**

***Panax quinquefolius* Linnaeus**

***Panax trifolius* Linnaeus**

Order Aristolochiales

Family Aristolochiaceae

***Asarum canadense* Linnaeus**

Order Asterales

Family Asteraceae

***Achillea millefolium* Linnaeus**

***Ageratina altissima* (Linnaeus) King & H. Rob.**

***Ambrosia artemisiifolia* Linnaeus**

***Ambrosia trifida* Linnaeus**

***Antennaria neglecta* Greene**

***Arctium lappa* Linnaeus**

***Arctium minus* Bernh.**

***Artemisia campestris* subsp. *caudata* (Michx.) H.M. Hall & Clem.**

***Artemisia vulgaris* Linnaeus**

***Aster* spp.**

***Bidens cernua* Linnaeus**

***Bidens connata* Muhl. ex Willd.**

***Bidens frondosa* Linnaeus**

Bidens ssp.

***Bidens vulgata* Greene**

***Carduus nutans* Linnaeus**

***Centaurea jacea* Linnaeus**

***Centaurea stoebe* subsp. *micranthos* (Gugler) Hayek**

***Cichorium intybus* Linnaeus**

***Cirsium arvense* (Linnaeus) Scop.**

***Cirsium discolor* (Muhl. ex Willd.) Spreng.**

***Cirsium muticum* Michx.**

***Cirsium oleraceum* (Linnaeus) Scop.**

Cirsium pumilum **var. *hilii*** **(Canby) B. Boivin**
Cirsium vulgare **(Savi) Ten.**
Echinacea purpurea **(Linnaeus) Moench**
Erechtites hieraciifolius **(Linnaeus) Rafinesque ex de Candolle**
Erigeron annuus **(Linnaeus) Pers.**
Erigeron canadensis **Linnaeus**
Erigeron philadelphicus **var. *philadelphicus*** **Linnaeus**
Erigeron pulchellus **Michx.**
Erigeron strigosus **Muhl. ex Willd.**
Eupatorium hyssopifolium **Linnaeus**
Eupatorium perfoliatum **Linnaeus**
Eurybia macrophylla **(Linnaeus) Cass.**
Euthamia graminifolia **(Linnaeus) Nutt.**
Eutrochium maculatum **var. *maculatum*** **(Linnaeus) E.E. Lamont**
Eutrochium purpureum **var. *purpureum*** **(Linnaeus) E.E. Lamont**
Helenium flexuosum **Raf.**
Helianthus annuus **Linnaeus**
Helianthus decapetalus **Linnaeus**
Helianthus giganteus **Linnaeus**
Helianthus tuberosus **Linnaeus**
Heliopsis helianthoides **(Linnaeus) Sweet**
Hieracium umbellatum **Linnaeus**
Hieracium vulgatum **Fr.**
Inula helenium **Linnaeus**
Lactuca canadensis **Linnaeus**
Lactuca serriola **Linnaeus**
Lapsana communis **Linnaeus**
Leucanthemum vulgare **Lam.**
Liatris cylindracea **Michx.**
Matricaria discoidea **DC.**
Nabalus albus **(Linnaeus) Hooker**
Nabalus altissimus **(Linnaeus) Hooker**
Onopordum acanthium **Linnaeus**
Packera aurea **(Linnaeus) Á. Löve & D. Löve**
Pilosella ×floribunda **(Wimmer & Grabowski) Fries**
Notes: X floribundum

Pilosella aurantiaca **(Linnaeus) F.W. Schultz & Schultz Bipontinus**

Pilosella caespitosa **(Dumortier) P.D. Sell & C. West**

Pilosella officinarum **F.W. Schultz & Schultz Bipontinus**

Pilosella piloselloides **subsp. *piloselloides* (Villars) Soják**

Pilosella piloselloides **subsp. *praealta* (Gochnat) S. Bräutigam & Greuter**

Prenanthes **spp.**

Ratibida pinnata **(Vent.) Barnhart**

Rudbeckia hirta **Linnaeus**

Rudbeckia laciniata **Linnaeus**

Solidago altissima **var. *altissima* Linnaeus**

Solidago caesia **Linnaeus**

Solidago canadensis **Linnaeus**

Solidago flexicaulis **Linnaeus**

Solidago gigantea **Aiton**

Solidago hispida **Muhl. ex Willd.**

Solidago juncea **Aiton**

Solidago nemoralis **subsp. *nemoralis* Aiton**

Solidago patula **Muhl. ex Willd.**

Solidago ptarmicoides **(Torr. & A. Gray) B. Boivin**

Solidago rigida **Linnaeus**

Solidago rugosa **subsp. *rugosa* Mill.**

Solidago **spp.**

Solidago ulmifolia **Muhl. ex Willd.**

Sonchus arvensis **subsp. *arvensis* Linnaeus**

Sonchus asper **(Linnaeus) Hill**

Sonchus oleraceus **Linnaeus**

Symphyotrichum cordifolium **(Linnaeus) G.L. Nesom**

Symphyotrichum ericoides **var. *ericoides* (Linnaeus) G.L. Nesom**

Symphyotrichum laeve **(Linnaeus) Á. Löve & D. Löve**

Symphyotrichum lanceolatum **(Willd.) G.L. Nesom**

Symphyotrichum lateriflorum **var. *lateriflorum* (Linnaeus) Á. Löve & D. Löve**

Symphyotrichum lateriflorum **var. *hirsuticaule* (Lindl. ex DC.) G.L. Nesom**

Symphyotrichum novae-angliae **(Linnaeus) G.L. Nesom**

Symphyotrichum novi-belgii (Linnaeus) G.L. Nesom

Symphyotrichum oolentangiense var. *oolentangiense* (Riddell) G.L. Nesom

Symphyotrichum oolentangiense (Riddell) G.L. Nesom

Symphyotrichum pilosum var. *pilosum* (Willd.) G.L. Nesom

Symphyotrichum puniceum (Linnaeus) Á. Löve & D. Löve

Symphyotrichum racemosum (Elliot) G.L. Nesom

Symphyotrichum spp.

Symphyotrichum urophyllum (Lindl.) G.L. Nesom

Tanacetum vulgare Linnaeus

Taraxacum officinale F.H. Wigg.

Tragopogon dubius Scop.

Tragopogon pratensis Linnaeus

Tussilago farfara Linnaeus

Xanthium strumarium Linnaeus

Family Campanulaceae

Lobelia siphilitica Linnaeus

Order Boraginales

Family Boraginaceae

Hackelia virginiana (Linnaeus) I.M. Johnst.

Myosotis scorpioides Linnaeus

Order Brassicales

Family Brassicaceae

Hesperis matronalis Linnaeus

Rorippa sylvestris (Linnaeus) Besser

Order Campanulales

Family Campanulaceae

Campanula rapunculoides Linnaeus

Campanula rotundifolia Linnaeus

Lobelia cardinalis Linnaeus

Lobelia inflata Linnaeus

Order Capparales

Family Brassicaceae

Alliaria petiolata (M. Bieb.) Cavara & Grande

Notes: or petiolata

Barbarea vulgaris W.T. Aiton
Berteroa incana (Linnaeus) DC.
Brassica juncea (Linnaeus) Czern.
Brassica rapa Linnaeus
Capsella bursa-pastoris (Linnaeus) Medik.
Cardamine bulbosa (Schreb. ex Muhl.) Britton, Sterns & Poggenb.
Cardamine concatenata (Michx.) Sw.
Cardamine diphylla (Michx.) Alph. Wood
Cardamine maxima (Nutt.) Alph. Wood
Cardamine pensylvanica Muhl. ex Willd.
Erysimum cheiranthoides Linnaeus
Nasturtium officinale W.T. Aiton
Rorippa palustris subsp. *palustris* Linnaeus
Sinapis alba Linnaeus
Sinapis arvensis Linnaeus
Sisymbrium altissimum Linnaeus
Thlaspi arvense Linnaeus
Turritis glabra Linnaeus

Order Caryophyllales

Family Amaranthaceae

Amaranthus albus Linnaeus
Amaranthus retroflexus Linnaeus
Amaranthus tuberculatus (Moq.) J.D. Sauer

Family Caryophyllaceae

Arenaria serpyllifolia Linnaeus
Cerastium arvense subsp. *arvense* Linnaeus
Cerastium fontanum subsp. *vulgare* (Hartm.) Greuter & Burdet
Dianthus armeria Linnaeus
Dianthus barbatus Linnaeus
Saponaria officinalis Linnaeus
Silene latifolia (Mill.) Britten & Rendle
Silene vulgaris (Moench) Garcke
Stellaria graminea Linnaeus

Family Chenopodiaceae

Chenopodium album Linnaeus

Family Phytolaccaceae

Phytolacca americana var. *americana* Linnaeus

Family Polygonaceae

Persicaria hydropiper (Linnaeus) Opiz

Persicaria pensylvanica (Linnaeus) M. Gómez

Rumex britannica Linnaeus

Rumex crispus Linnaeus

Rumex obtusifolius Linnaeus

Rumex verticillatus Linnaeus

Family Portulacaceae

Claytonia virginica Linnaeus

Order Celastrales

Family Aquifoliaceae

Ilex verticillata (Linnaeus) A. Gray

Family Celastraceae

Celastrus scandens Linnaeus

Euonymus alatus (Thunb.) Siebold

Euonymus atropurpureus Jacq.

Euonymus obovatus Nutt.

Order Cornales

Family Cornaceae

Cornus alternifolia L. f.

Cornus canadensis Linnaeus

Cornus obliqua Raf.

Cornus racemosa Lam.

Cornus rugosa Lam.

Cornus stolonifera Michx.

Order Cucurbitales

Family Cucurbitaceae

Echinocystis lobata (Michx.) Torr. & A. Gray

Order Dipsacales

Family Adoxaceae

Viburnum acerifolium Linnaeus

Viburnum lantana Linnaeus

Viburnum lentago Linnaeus

Viburnum opulus Linnaeus

Viburnum opulus var. *americanum* Aiton

Viburnum rafinesquianum Schult.

Family Caprifoliaceae

Caprifoliaceae spp.

Diervilla lonicera Mill.

Dipsacus sativus (Linnaeus) Honck.

Linnaea borealis subsp. *longiflora* (Torr.) Hultén

Lonicera canadensis Bartram & W. Bartram ex Marshall

Lonicera dioica Linnaeus

Lonicera morrowii A. Gray

Lonicera tatarica Linnaeus

Sambucus canadensis Linnaeus

Sambucus nigra Linnaeus

Sambucus racemosa subsp. *pubens* (Michx.) House

Symphoricarpos albus (Linnaeus) S.F. Blake

Symphoricarpos occidentalis Hook.

Triosteum aurantiacum E.P. Bicknell

Family Dipsacaceae

Dipsacus fullonum Linnaeus

Family Valerianaceae

Valeriana edulis subsp. *cilata* (Torrey & A. Gray) F.G. Meyer

Order Ericales

Family Balsaminaceae

Impatiens capensis Meerb.

Family Ericaceae

Epigaea repens Linnaeus

Gaultheria hispidula (Linnaeus) Muhl. ex Bigelow

Gaultheria procumbens Linnaeus

Vaccinium angustifolium Aiton

Vaccinium myrtilloides Michx.

Family Primulaceae

Lysimachia arvensis (Linnaeus) U. Manns & Anderberg

Family Pyrolaceae

Pyrola elliptica Nutt.

Pyrola spp.
Order Euphorbiales
Family Euphorbiaceae
Euphorbia cyparissias Linnaeus
Euphorbia esula Linnaeus

Checklist of species observed or collected at the *rare* Charitable Research Reserve in Cambridge, Ontario, Canada. The second of two checklists for Kingdom Plantae, this checklist contains records from Phyla Magnoliophyta (Class Magnoliopsida), Marchantiophyta, Pinophyta, and Pteridophyta.

Phylum Magnoliophyta
Kingdom Plantae
Class Magnoliopsida
Order Fabales
Family Fabaceae
Amorpha canescens Pursh
Amphicarpaea bracteata (Linnaeus) Fernald
Apios americana Medik.
Desmodium canadense (Linnaeus) DC.
Glycyrrhiza lepidota Pursh
Lespedeza capitata Michx.
Lotus corniculatus Linnaeus
Medicago lupulina Linnaeus
Medicago sativa subsp. *sativa* Linnaeus
Melilotus albus Medik.
Robinia pseudoacacia Linnaeus
Trifolium aureum Pollich
Trifolium campestre Schreb.
Trifolium hybridum Linnaeus
Trifolium pratense Linnaeus

Trifolium repens Linnaeus

Vicia americana Muhl. ex Willd.

Vicia cracca Linnaeus

Order Fagales

Family Betulaceae

Alnus glutinosa (Linnaeus) Gaertn.

Alnus incana subsp. *rugosa* (Du Roi) R.T. Clausen

Betula alleghaniensis Britton

Betula papyrifera Marshall

Betula pendula Roth

Betula populifolia Marshall

Betula pumila Linnaeus

Carpinus caroliniana subsp. *virginiana* (Marshall) Furlow

Corylus americana Walter

Corylus cornuta subsp. *cornuta* Marshall

Ostrya virginiana (Mill.) K. Koch

Family Fagaceae

Fagus grandifolia Ehrh.

Quercus alba Linnaeus

Quercus bicolor Willd.

Quercus ellipsoidalis E.J. Hill

Quercus macrocarpa Michx.

Quercus palustris Münchh.

Quercus rubra Linnaeus

Quercus velutina Lam.

Family Juglandaceae

Juglans nigra Linnaeus

Order Gentianales

Family Apocynaceae

Apocynum androsaemifolium Linnaeus

Apocynum cannabinum Linnaeus

Apocynum sp.

Notes: X floribundum

Vinca minor Linnaeus

Family Asclepiadaceae

Asclepias exaltata Linnaeus

Asclepias incarnata subsp. *incarnata* Linnaeus

Asclepias syriaca Linnaeus

Asclepias tuberosa Linnaeus

Family Gentianaceae

Gentiana andrewsii Griseb.

Gentiana rubricaulis Schwein.

Gentianella quinquefolia subsp. *quinquefolia* (Linnaeus) Small

Gentianopsis crinita (Froel.) Ma

Gentianopsis virgata subsp. *virgata* (Raf.) Holub

Notes: or virgata

Family Rubiaceae

Galium aparine Linnaeus

Galium asprellum Michx.

Order Geraniales

Family Balsaminaceae

Impatiens glandulifera Royle

Impatiens pallida Nutt.

Family Geraniaceae

Geranium maculatum Linnaeus

Geranium robertianum Linnaeus

Family Oxalidaceae

Oxalis corniculata Linnaeus

Oxalis montana Raf.

Oxalis stricta Linnaeus

Order Haloragales

Family Haloragaceae

Myriophyllum heterophyllum Michx.

Myriophyllum verticillatum Linnaeus

Order Hamamelidales

Family Platanaceae

Platanus occidentalis Linnaeus

Order Juglandales

Family Juglandaceae

Carya cordiformis **(Wangenh.) K. Koch**

Carya glabra **(Mill.) Sweet**

Carya ovata **var. *ovata* (Mill.) K. Koch**

Juglans cinerea **Linnaeus**

Order Lamiales

Family Boraginaceae

Anchusa arvensis **(Linnaeus) M. Bieb.**

Cynoglossum officinale **Linnaeus**

Echium vulgare **Linnaeus**

Lithospermum parviflorum **Weakley, Witsell & D. Estes**

Myosotis laxa **Lehm.**

Myosotis verna **Nutt.**

Symphytum officinale **Linnaeus**

Family Lamiaceae

Agastache nepetoides **(Linnaeus) Kuntze**

Ajuga reptans **Linnaeus**

Blephilia hirsuta **(Pursh) Benth.**

Clinopodium vulgare **Linnaeus**

Collinsonia canadensis **Linnaeus**

Galeopsis tetrahit **Linnaeus**

Glechoma hederacea **Linnaeus**

Lamium amplexicaule **Linnaeus**

Leonurus cardiaca **Linnaeus**

Lycopus americanus **Muhl. ex W.P.C. Bartram**

Lycopus asper **Greene**

Lycopus uniflorus **Michx.**

Melissa officinalis **Linnaeus**

Mentha arvensis **auct. non L.**

Mentha canadensis **Linnaeus**

Mentha **sp.**

Notes: X piperita

Mentha spicata Linnaeus
Monarda didyma Linnaeus
Monarda fistulosa Sims
Nepeta cataria Linnaeus
Physostegia virginiana subsp. *virginiana* (Linnaeus) Benth.
Prunella vulgaris subsp. *vulgaris* Linnaeus
Prunella vulgaris subsp. *lanceolata* (W.P.C. Barton) Piper & Beattie
Prunella vulgaris Linnaeus
Pycnanthemum virginianum (Linnaeus) Rob. & Fernald
Scutellaria galericulata Linnaeus
Scutellaria lateriflora Linnaeus
Stachys hispida Pursh
Stachys palustris Linnaeus
Teucrium canadense subsp. *canadense* Linnaeus

Family Oleaceae
Ligustrum vulgare Linnaeus
Syringa vulgaris Linnaeus

Family Plantaginaceae
Linaria vulgaris Mill.
Plantago lanceolata Linnaeus
Plantago major Linnaeus
Plantago rugelii Decne.
Veronica anagallis-aquatica Linnaeus

Family Scrophulariaceae
Verbascum phoeniceum Linnaeus
Verbascum thapsus Linnaeus
Veronica chamaedrys Linnaeus
Veronica officinalis Linnaeus
Veronica serpyllifolia Linnaeus

Family Verbenaceae
Verbena hastata Linnaeus
Verbena simplex Lehm.
Verbena stricta Vent.
Verbena urticifolia Linnaeus

Order Laurales

Family Lauraceae

Lindera benzoin **(Linnaeus) Blume**

Order Linales

Family Linaceae

Linum virginianum **Linnaeus**

Order Magnoliales

Family Annonaceae

Asimina triloba **(Linnaeus) Dunal**

Order Malpighiales

Family Hypericaceae

Hypericum ascyron **Linnaeus**

Hypericum mutilum **subsp.** ***mutilum*** **Linnaeus**

Hypericum perforatum **Linnaeus**

Hypericum punctatum **Lam.**

Family Salicaceae

Populus alba **Linnaeus**

Populus balsamifera **Linnaeus**

Populus deltoides **W. Bartram ex Marshall**

Populus grandidentata **Michx.**

Populus nigra **Linnaeus**

Populus tremuloides **Michx.**

Order Malvales

Family Malvaceae

Abutilon theophrasti **Medik.**

Malva moschata **Linnaeus**

Family Tiliaceae

Tilia americana **Linnaeus**

Order Myrtales

Family Lythraceae

Lythrum salicaria **Linnaeus**

Family Onagraceae

Chamerion angustifolium **subsp.** ***angustifolium*** **(Linnaeus) Holub**

Circaea alpina **Linnaeus**

Circaea canadensis **subsp.** ***canadensis*** **(Linnaeus) Hill**

Epilobium ciliatum subsp. *glandulosum* (Lehm.) Hoch & P.H. Raven

Epilobium coloratum Biehler

Epilobium hirsutum Linnaeus

Epilobium leptophyllum Raf.

Epilobium strictum Muhl.

Ludwigia polycarpa Short & Peter

Oenothera biennis Linnaeus

Oenothera serrulata Nuttall

Family Thymelaeaceae

Dirca palustris Linnaeus

Order Nymphaeales

Family Cabombaceae

Brasenia schreberi J.F. Gmel.

Order Papaverales

Family Papaveraceae

Chelidonium majus Linnaeus

Dicentra canadensis (Goldie) Walp.

Dicentra cucullaria (Linnaeus) Bernh.

Sanguinaria canadensis Linnaeus

Order Piperales

Family Saururaceae

Saururus cernuus Linnaeus

Order Plantaginales

Family Plantaginaceae

Callitriche palustris Linnaeus

Chelone glabra Linnaeus

Digitalis lanata Ehrh.

Digitalis lutea Linnaeus

Notes: or grandiflora

Digitalis purpurea Linnaeus

Order Polygalales

Family Polygalaceae

Polygala spp

Polygala verticillata var. *verticillata* Linnaeus

Polygaloides paucifolia (Willdenow) J.R. Abbott

Order Polygonales

Family Polygonaceae

Fallopia convolvulus (Linnaeus) Á. Löve

Fallopia scandens (Linnaeus) Holub

Persicaria hydropiperoides (Michx.) Small

Persicaria maculosa Gray

Persicaria punctata (Elliott) Small

Persicaria sagittata (Linnaeus) H. Gross

Polygonum aviculare Linnaeus

Order Primulales

Family Primulaceae

Lysimachia borealis (Rafinesque) U. Manns & Anderberg

Lysimachia ciliata Linnaeus

Lysimachia nummularia Linnaeus

Lysimachia thyrsiflora Linnaeus

Primula mistassinica Michx.

Order Ranunculales

Family Berberidaceae

Berberis canadensis Mill.

Berberis thunbergii DC.

Berberis vulgaris Linnaeus

Caulophyllum thalictroides (Linnaeus) Michx.

Podophyllum peltatum Linnaeus

Family Menispermaceae

Menispermum canadense Linnaeus

Family Ranunculaceae

Actaea pachypoda Elliott

Actaea rubra (Aiton) Willd.

Actaea spp.

Anemone acutiloba (DC.) G. Lawson

Anemone americana (DC.) H. Hara

Anemone canadensis Linnaeus

Anemone cylindrica A. Gray

Anemone quinquefolia Linnaeus
Anemone virginiana var. *virginiana* Linnaeus
Anemone virginiana var. *alba* (Oakes) Alph. Wood
Aquilegia canadensis Linnaeus
Caltha palustris Linnaeus
Clematis virginiana Linnaeus
Coptis trifolia (Linnaeus) Salisb.
Ranunculus abortivus Linnaeus
Ranunculus acris Linnaeus
Ranunculus hispidus var. *caricetorum* (Greene) T. Duncan
Ranunculus recurvatus var. *recurvatus* Poir.
Ranunculus repens Linnaeus
Ranunculus sceleratus var. *sceleratus* Linnaeus
Thalictrum dasycarpum Fisch. & Avé-Lall.
Thalictrum dioicum Linnaeus
Thalictrum pubescens Pursh
Thalictrum thalictroides (Linnaeus) Eames & B. Boivin

Order Rhamnales

Family Elaeagnaceae
Elaeagnus angustifolia Linnaeus
Elaeagnus umbellata Thunb.
Shepherdia canadensis (Linnaeus) Nutt.

Family Rhamnaceae
Frangula alnus Mill.
Rhamnus alnifolia L'Hér.

Order Rosales

Family Cannabaceae
Humulus lupulus Linnaeus

Family Crassulaceae
Sedum acre Linnaeus

Family Grossulariaceae
Ribes americanum Mill.
Ribes cynosbati Linnaeus
Ribes glandulosum Grauer
Ribes hirtellum Michx.

Ribes lacustre **(Pers.) Poir.**

Ribes oxyacanthoides **var. *oxycanthoides* Linnaeus**

Ribes rubrum **Linnaeus**

Ribes ssp.

Ribes triste **Pall.**

Family Hydrangeaceae

Philadelphus coronarius **Linnaeus**

Family Rhamnaceae

Rhamnus cathartica **Linnaeus**

Family Rosaceae

Agrimonia gryposepala **Wallr.**

Amelanchier arborea **(F. Michx.) Fernald**

Amelanchier laevis **Wiegand**

Amelanchier spicata **(Lam.) K. Koch**

Aruncus dioicus **(Walter) Fernald**

Crataegus chrysocarpa **Ashe**

Crataegus crus-galli **Linnaeus**

Crataegus dissona **Sarg.**

Crataegus punctata **Jacq.**

Crataegus **spp.**

Dasiphora fruticosa **auct. non (Linnaeus) Rydb.**

Fragaria vesca **Linnaeus**

Fragaria virginiana **Duchesne**

Geum aleppicum **Jacq.**

Geum canadense **Jacq.**

Geum fragarioides **(Michaux) Smedmark**

Geum laciniatum **Murray**

Geum rivale **Linnaeus**

Geum urbanum **Linnaeus**

Malus coronaria **(Linnaeus) Mill.**

Malus pumila **Mill.**

Physocarpus opulifolius **(Linnaeus) Maxim.**

Potentilla anserina **subsp. *anserina* Linnaeus**

Potentilla argentea **Linnaeus**

Potentilla norvegica **Linnaeus**

Potentilla recta Linnaeus
Potentilla simplex Michx.
Prunus americana Marshall
Prunus avium (Linnaeus) L.
Prunus mahaleb Linnaeus
Prunus pensylvanica L. f.
Prunus serotina Ehrh.
Prunus virginiana subsp. *virginiana* Linnaeus
Pyrus communis Linnaeus
Rosa blanda Aiton
Rosa cinnamomea L. sensu 1759, non 1753
Rosa multiflora Thunb.
Rosa palustris Marshall
Rosa rugosa Thunb.
Rosa virginiana Mill.
Rubus allegheniensis Porter
Rubus canadensis Linnaeus
Rubus flagellaris Willd.
Rubus hispidus Linnaeus
Rubus idaeus Linnaeus
Rubus occidentalis Linnaeus
Rubus pubescens Raf.
Rubus repens (Linnaeus) Kuntze
Sorbus americana Marshall
Sorbus aucuparia Linnaeus
Spiraea alba Du Roi

Family Saxifragaceae

Micranthes virginiensis (Michx.) Small
Mitella diphylla Linnaeus
Mitella nuda Linnaeus
Parnassia glauca Raf.
Tiarella cordifolia Linnaeus

Order Rubiales

Family Rubiaceae

Galium circaezans Michx.

Galium mollugo **Linnaeus**

Galium palustre **Linnaeus**

Galium tinctorium **Linnaeus**

Galium trifidum **subsp. *trifidum* Linnaeus**

Galium triflorum **Michx.**

Mitchella repens **Linnaeus**

Order Salicales

Family Salicaceae

Salix ×fragilis **Linnaeus**

Salix alba **Linnaeus**

Salix amygdaloides **Andersson**

Salix bebbiana **Sarg.**

Salix candida **Flüggé ex Willd.**

Salix cordata **Muhl.**

Salix discolor **Muhl.**

Salix eriocephala **Michx.**

Salix exigua **Nutt.**

Salix humilis **var. *humilis* Marshall**

Salix lucida **Muhl.**

Salix nigra **Marshall**

Salix pedicellaris **Pursh**

Salix petiolaris **Sm.**

Salix purpurea **Linnaeus**

Salix serissima **(L.H. Bailey) Fernald**

Salix viminalis **Linnaeus**

Order Sapindales

Family Aceraceae

Acer nigrum **F. Michaux**

Acer platanoides **Linnaeus**

Acer rubrum **Linnaeus**

Acer saccharinum **Linnaeus**

Acer saccharum **Marshall**

Acer spicatum **Lam.**

Family Anacardiaceae

Rhus aromatica **Aiton**

Rhus typhina Linnaeus
Toxicodendron radicans subsp. *negundo* (Greene) Gillis
Toxicodendron radicans var. *rydbergii* (Small ex Rydb.) Erskine
Toxicodendron vernix (Linnaeus) Kuntze
Family Rutaceae
Zanthoxylum americanum Mill.
Family Sapindaceae
Acer negundo Linnaeus
Aesculus hippocastanum Linnaeus
Family Staphyleaceae
Staphylea trifolia Linnaeus
Order Saxifragales
Family Haloragaceae
Myriophyllum sibiricum Kom.
Order Scrophulariales
Family Oleaceae
Fraxinus americana Linnaeus
Fraxinus nigra Marsh.
Fraxinus pennsylvanica Marshall
Family Orobanchaceae
Conopholis americana (Linnaeus) Wallr.
Epifagus virginiana (Linnaeus) W.P.C. Barton
Family Scrophulariaceae
Aureolaria flava (Linnaeus) Farw.
Aureolaria virginica (Linnaeus) Pennell
Pedicularis canadensis Linnaeus
Penstemon digitalis Nutt. ex Sims
Penstemon hirsutus (Linnaeus) Willd.
Scrophularia lanceolata Pursh
Scrophularia marilandica Linnaeus
Verbascum blattaria Linnaeus
Veronica americana Schwein. ex Benth.
Order Solanales
Family Convolvulaceae
Calystegia spithamaea (Linnaeus) Pursh

Convolvulus arvensis **Linnaeus**

Cuscuta gronovii **Willd. ex Schult.**

Family Hydrophyllaceae

Hydrophyllum canadense **Linnaeus**

Hydrophyllum virginianum **Linnaeus**

Family Polemoniaceae

Phlox subulata **subsp.** ***subulata*** **Linnaeus**

Family Solanaceae

Physalis heterophylla **Nees**

Solanum dulcamara **Linnaeus**

Solanum lycopersicum **Linnaeus**

Order Urticales

Family Moraceae

Morus alba **Linnaeus**

Family Ulmaceae

Celtis occidentalis **Linnaeus**

Ulmus americana **Linnaeus**

Ulmus pumila **Linnaeus**

Ulmus rubra **Muhl.**

Ulmus thomasii **Sarg.**

Family Urticaceae

Boehmeria cylindrica **(Linnaeus) Sw.**

Laportea canadensis **(Linnaeus) Wedd.**

Pilea pumila **(Linnaeus) A. Gray**

Urtica dioica **subsp.** ***gracilis*** **(Aiton) Selander**

Urtica dioica **subsp.** ***dioica*** **Linnaeus**

Order Violales

Family Cucurbitaceae

Sicyos angulatus **Linnaeus**

Family Violaceae

Viola adunca **var.** ***adunca*** **Sm.**

Viola canadensis **Linnaeus**

Viola cucullata **Aiton**

Viola labradorica **Schrank**

Viola macloskeyi **F.E. Lloyd**

Viola nephrophylla Greene
Viola pubescens Aiton
Viola renifolia A. Gray
Viola rostrata Pursh
Viola sororia Willd.
Viola sororia var. *affinis* (Leconte) L.E. McKinney
Viola spp.
Order Vitales
Family Vitaceae
Parthenocissus quinquefolia (Linnaeus) Planch.
Vitis riparia Michx.
Order Lamiales
Family Phrymaceae
Phryma leptostachya Linnaeus
Order Saxifragales
Family Hamamelidaceae
Hamamelis virginiana Linnaeus
Phylum Marchantiophyta
Class Jungermanniopsida
Order Metzgeriales
Family Aneuraceae
Aneura pinguis (Linnaeus) Dumort.
Order Jungermanniales
Family Geocalycaceae
Lophocolea heterophylla (Schrad.) Dum.
Family Porellaceae
Porella platyphylla (Linnaeus) Pfeiff.
Family Radulaceae
Radula complanata (Linnaeus) Dum.
Order Porellales
Family Frullaniaceae
Frullania eboracensis Gottsche
Class Marchantiopsida
Order Marchantiales
Family Aytoniaceae

Reboulia hemisphaerica (Linnaeus) Raddi

Family Conocephalaceae

Conocephalum conicum (Linnaeus) Lindb.

Family Marchantiaceae

Marchantia polymorpha Linnaeus

Phylum Pinophyta

Class Pinopsida

Order Cupressales

Family Cupressaceae

Juniperus communis Linnaeus

Juniperus communis var. *depressa* Pursh

Order Pinales

Family Cupressaceae

Thuja occidentalis Linnaeus

Family Pinaceae

Larix decidua Mill.

Larix laricina (Du Roi) K. Koch

Picea abies (Linnaeus) Karst.

Picea glauca (Moench) Voss

Picea pungens Engelm.

Pinus banksiana Lamb.

Pinus resinosa Aiton

Pinus strobus Linnaeus

Pinus sylvestris Linnaeus

Tsuga canadensis (Linnaeus) Carrière

Phylum Pteridophyta

Class Filicopsida

Order Ophioglossales

Family Ophioglossaceae

Botrypus virginianus (Linnaeus) Michaux

Order Polypodiales

Family Aspleniaceae

Asplenium platyneuron (Linnaeus) Britton, Sterns & Poggenb.

Asplenium trichomanes subsp. *trichomanes* Linnaeus

Asplenium viride Huds.

Family Dennstaedtiaceae

***Pteridium aquilinum* var. *latiusculum* (Desv.) Underw. ex A. Heller**

Family Dryopteridaceae

***Athyrium filix-femina* var. *angustum* (Willd.) G. Lawson**

***Cystopteris bulbifera* (Linnaeus) Bernh.**

***Cystopteris fragilis* (Linnaeus) Bernh.**

Notes: or tenuis

***Deparia acrostichoides* (Sw.) M. Kato**

***Dryopteris ×triploidea* Wherry**

***Dryopteris carthusiana* (Vill.) H.P. Fuchs**

Notes: or spinulosa

***Dryopteris clintoniana* (D.C. Eaton) Dowell**

***Dryopteris cristata* (Linnaeus) A. Gray**

***Dryopteris goldiana* (Hook. ex Goldie) A. Gray**

***Dryopteris intermedia* (Muhl. ex Willd.) A. Gray**

***Dryopteris marginalis* (Linnaeus) A. Gray**

***Gymnocarpium dryopteris* (Linnaeus) Newman**

***Matteuccia struthiopteris* var. *pensylvanica* (Willd.) C.V. Morton**

***Onoclea sensibilis* Linnaeus**

***Polystichum acrostichoides* (Michx.) Schott**

Family Osmundaceae

***Osmunda claytoniana* Linnaeus**

***Osmunda regalis* var. *spectabilis* (Willd.) A. Gray**

Family Polypodiaceae

***Polypodium virginianum* Linnaeus**

Notes: or vulgare

Family Pteridaceae

***Adiantum pedatum* Linnaeus**

***Pellaea glabella* Mett. ex Kuhn**

Family Thelypteridaceae

***Thelypteris noveboracensis* (Linnaeus) Nieuwl.**

***Thelypteris palustris* var. *pubescens* (G. Lawson) Fernald**

Class Polypodiopsida

Order Osmundales

Family Osmundaceae

***Osmundastrum cinnamomea* (Linnaeus) C. Presl**

Analysis

The two surveying strategies – a four-month long terrestrial arthropod survey, followed by a concentrated bioblitz targeting a variety of taxa – resulted in 25,287 and 3,502 specimens barcoded, respectively, out of a total of 32,645 specimens collected. Observations of an additional 125 species and two higher taxa (for which no voucher specimen was kept) were recorded at the bioblitz (Suppl. material 7). Altogether the surveys covered 14 phyla, 29 classes, 117 orders, and 531 families of animals, plants, fungi and lichens. This comprised 3,986 BINs of animals, 1,193 of which are identified to species (Suppl. materials 4, 8, 9).

The most diverse groups were Ichneumonidae, Chironomidae, and Cecidomyiidae with 188, 365, and 584 BINs respectively. In terms of abundance, the three groups Sciaridae, Cecidomyiidae, and Chironomidae had the largest number of specimens with 1,528, 2,477, and 9,636 specimens. The most abundant BINs were BOLD:ACC0651 (Thripidae: *Taeniothrips inconsequens*), BOLD:AAD5253 (Chironomidae: *Thienemanniella xena*), and BOLD:AAP5920 (Chironomidae: *Cricotopus triannulatus*) with 349, 636, and 1619 specimens collected. For these three BINs, and many similarly abundant BINs, the presence of closely allied and morphologically similar taxa makes oversampling of these exceptionally common species unavoidable.

Combining all existing data results in a final tally of 3,348 species (Table 1), 1,102 of them new records for the reserve (Suppl. material 10). An incidence-based rarefaction analysis (Fig. 2 Suppl. material 11) computed in EstimateS (Colwell and Elsensohn 2014) approximates that 6,744 BINs of invertebrate animals are present at the reserve, indicating that our inventory is at most 30% complete. 1,918 BINs were singletons (i.e. represented by one specimen); the high proportion of singletons (48%) is another indication that the species inventory is far from complete (Magurran 2004). For comparison, the Great Smoky Mountains National Park (North Carolina and Tennessee, United States) established an ATBI effort in 1998 and have tallied 18,545 of the estimated 100,000 species present in the park. In only a few months, our survey found 20% of the Great Smoky Mountains total from 17 years of effort. The Great Smoky Mountains National Park has recognized the contribution DNA barcoding can play in their ATBI effort and have included this method in their survey (e.g., Scholtens and Wagner 2007, Zhou et al. 2011).

Discussion

The present study has conducted an expansive biotic survey, released the data in several public biodiversity data repositories, and published the unique process and findings – all within a relatively modest timeframe. This model for rapid generation and dissemination of critical biodiversity data could be followed to conduct regional assessments of biodiversity status and change, and potentially aid in evaluating progress towards the Aichi Targets of the Strategic Plan for Biodiversity 2011–2020. To fully appreciate this approach, a closer look at four elements is presented: highlights of the biotic inventory, the multiple levels of acceleration, future improvements to the resource, and the utility of the resource going forward.

Table 1.

Summary of species inventory for ***rare*** **Charitable Research Reserve** in Cambridge, Ontario, Canada, following the present study.

Major Group	Common Name	No. on previous inventory	No. on 2015 surveys	New Species	New Total
Annelida	Earthworms	0	2	2	2
Arthropoda:Arachnida	Spiders and others	0	198	198	198
Arthropoda:Crustacea	Crustaceans	0	7	7	7
Arthropoda:Entognatha	Collembola	0	9	9	9
Arthropoda:Insecta	Insects	832	895	778	1,610
Arthropoda:Myriapoda	Millipedes, Centipedes	0	6	6	6
Chordata:Actinopterygii	Fishes	28	14	3	31
Chordata:Amphibia	Amphibians	13	2	0	13
Chordata:Aves	Birds	231	87	0	231
Chordata:Mammalia	Mammals	37	6	1	38
Chordata:Reptilia	Reptiles	10	0	0	10
Fungi	Fungus, Lichens	191	84	60	251
Mollusca	Snails, Clams	0	18	18	18
Plantae	Plants, Mosses, Liverworts	901	103	20	921
Protozoa	Protozoans	3	3	0	3
	Total Species	2,246	1,433	1,102	3,348

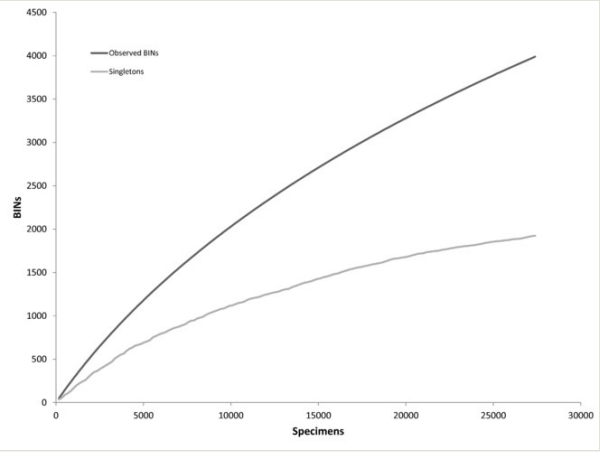

Figure 2.

Accumulation curves for singleton and total observed BINs for the 2015 survey of ***rare*** **Charitable Research Reserve**.

Resource Highlights

The biotic inventory of ***rare*** **Charitable Research Reserve** performed between May and August 2015 was noteworthy for a number of reasons. The taxonomic scope of the surveys, which covered fourteen phyla over several kingdoms, was only made possible by the integration of DNA barcoding and by assembling a diverse group of experts. Taxa that appeared under-represented on the prior species inventory were targeted where possible, and in many cases, increased significantly. Spiders (Araneae) for instance were completely absent from the prior inventory. Using the expertise of single specialist, focused collecting efforts, and a comprehensive barcode reference library for Canadian spiders (Blagoev et al. 2015) our survey resulted in the addition of 181 species (12.3% of Canadian fauna), two of which were newly recorded for BOLD (*Grammonota inornata*, *Philodromus praelustris*) and three representing new provincial records (*Cicurina pallida*, *Neoantistea gosiuta*, *Xysticus winnipegensis*) (Suppl. material 12). Likewise, only 21 lichen species were reported from ***rare*** previously, but 53 were collected in a single day at the reserve, increasing the species list to 66. Not all the significant increases were in understudied taxa however: 18 snail and slug species (Mollusca) were added, all new to the reserve; 14 species of fishes were observed, adding three to the previous list of 28; and one mammal (hoary bat, *Lasiurus cinereus*) of the six observed were added to the list for a total of 37. In terms of BINs, many under-represented taxa did not witness a dramatic increase in named species, but did see large numbers of individual (and unnamed) BINs inventoried; the mites (Acari; 268 BINs) and gall midges (Cecidomyiidae; 584 BINs) are remarkable examples.

Rapid Creation of the Resource

The rapidness of conducting this inventory was due to the acceleration of several steps that comprise the procedure. Firstly, several types of passive traps were employed to acquire large sample sizes for minimal collector effort. For instance, malaise traps often collect 2,000 specimens in a single week with only minutes of servicing time. Secondly, as discussed above, the addition of DNA barcoding streamlines sorting of the material, dividing the specimens into distinct units, minimizing the total number of specimens that require examination. Thirdly, in addition to the initial sorting, barcoding also provides nearly instant taxonomic assignment by querying against reference libraries using BOLD; the resolution of the assignment for queried records depends on the completeness of the reference library. Fourthly, the processing of the bioblitz material and analyses of the DNA barcode data were accelerated at all possible stages to test how quickly a large volume of specimens could proceed through all steps. The generation of data following the bioblitz was impressive: tissue sampling and lysis within 12 hours; DNA extraction and PCR within 24 h; cycle sequencing, cleanup and sequencer loading by 48 h; edited and validated sequences on BOLD by 72 h; taxonomic assignment, data release and manuscript presubmission by 96 h; final manuscript submission to BDJ by 108 h. The laboratory steps are mostly accelerated by automation, while data sharing is greatly facilitated by data release platforms such as BOLD and the Integrated Publishing Toolkit of Canadensys (Robertson et al. 2014), and finally, the manuscript stage is sped up considerably by the online writing tools introduced by Pensoft and other publishers.

Refinement of the Resource

Many BINs are presently identified only to family, subfamily, or at most, genus level. It's important to note that the inventoried taxa that lack species-level determination, including intractable groups such as mites and midges, will be refined over time. Not only does DNA barcoding, empowered by the BIN system, roughly sort the material to direct and minimize the efforts of taxonomic experts (deWaard et al. 2009), but it also facilitates crowd-sourcing of taxonomic refinement. For example, if two specimens are collected in unrelated projects and locations, but assigned to the same BIN, any taxonomic determination on one specimen will be applicable to the other, and the pertinent data (such as identifier and locality) is shared on the public BIN page. For the specimens of this study, their taxonomy could be honed by the efforts of completely unrelated (but now linked) projects.

In addition to this passive approach to refining the taxonomy of these specimens, we will be actively pursuing expert determinations for the unnamed BINs. For many groups, the experts among our coauthors will be able to provide species level resolution in a short period of time (e.g., J.F.-T. specializes in Braconidae, particularly the subfamily Microgastrinae). For other BINs, and over a longer period of time, it will be necessary to solicit determinations from our network of collaborators that specialize on Nearctic taxa. The public release of these data to multiple data repositories should also aid in recruiting active specialists presently outside our network. The vouchered material, all deposited in a single repository (BIOUG), can be quickly assembled and loaned out, along with the

associated data and files that may assist in determinations (e.g., tree files and image libraries: Suppl. materials 8, 9). There will however be taxa for which species names will be problematic, due to a lack of active specialists, keys, and/or revisionary work, and where a large proportion of that taxon awaits description. For example, the number of gall midges (Diptera: Cecidomyiidae) inventoried for rare (584) is nearly six times the number of Canadian species described to date (ca. 100, following Gagne and Jaschhof 2014).

When a significant number of species and other taxon categories become available, the refined dataset can be updated in the various data repositories and potentially in a second, updated version of the paper in BDJ. Any subsequent versions – each with a separate Digital Object Identifier (DOI) – would be linked to the original paper, allowing for continuing improvement and additions to the species list for the reserve. It is important to emphasize that the taxa awaiting species-level determination still have persistent identifiers as part of the BIN system; each BIN is assigned a BOLD-generated uniform resource identifier (URI) upon its establishment (e.g. BOLD:AAA0001). Until the species binomial is determined or described, this URI can be used in its place. For example, this URI permits assessing and comparing local diversity (Young et al. 2012) despite uncertainty in taxonomic placement.

Utility of the Resource

While the overarching objective of the study was to develop, assess and demonstrate a model for conducting and disseminating DNA barcode-assisted biotic surveys, a valuable resource was created in the process. The ***rare* Charitable Research Reserve** provides a unique urban reserve with the infrastructure necessary to conduct research in its diversity of habitats; a barcode reference library and updated species inventory can now both be added to the infrastructure shared with their researchers and educators. Ecological studies in particular, such as the ongoing prairie community field experiments (e.g., Harvey and MacDougall 2014), could benefit greatly from this resource that allows the investigation of ecological questions previously impossible to address (Joly et al. 2014, Kress et al. 2015). Moreover, these studies and others are increasingly using next generation sequencing (NGS) technologies, where validated reference libraries linked to voucher specimens are of critical importance, since this link is generally lost in NGS studies (Cristescu 2014). This reference library created can also be amalgamated with external barcode records, local inventories, and taxon-specific efforts to create regional and national libraries; this study for instance has enhanced the reference library for animals by providing 468 unique BINs to BOLD. Finally, as mentioned above, it is crucial that we begin to assess biodiversity change and disseminate these data widely -- the resource created here can form the baseline for accessible, repeated assessments, to gauge trends in an important temperate reserve.

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Author contributions

Author contributions: P.D.N.H. and J.R.D. designed the study; J.S., C.N.S. and M.R.Y. oversaw specimen and sequence analyses; A.C.T., J.R.D. and V.L.-B. conducted the analyses. J.M. and E.S. provided specimen images. All authors discussed the results and contributed to specimen collection, identifications, and to the manuscript, which was written by J.R.D., R.D., J.F.-T.

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Supplementary materials

Suppl. material 1: Species inventory of rare prior to May 2015

Authors: Telfer et al.
Data type: checklist
Brief description: Species inventory for *rare* Charitable Research Reserve in Cambridge, Canada as of May 2015, prior to the present study.
Filename: Suppl materials 1 - Existing Inventory.xlsx - Download file (156.97 kb)

Suppl. material 2: Bat protocols

Authors: Telfer et al.
Data type: protocols
Brief description: Protocols for the bat component of *rare* BioBlitz
Filename: Suppl materials 2 - Bat protocols.pdf - Download file (362.98 kb)

Suppl. material 3: Lysis, primer and marker details

Authors: Telfer et al.
Data type: laboratory
Brief description: Details for laboratory work.
Filename: Suppl materials 3 - Lab Details.xlsx - Download file (10.47 kb)

Suppl. material 4: Summary data for 2015 inventory

Authors: Telfer et al.
Data type: summary
Brief description: Summary data for the 28,789 specimens collected for the 2015 inventory, including BIN assignments and locality
Filename: Suppl materials 4 - Summary Data.xlsx - Download file (2.18 MB)

Suppl. material 5: Darwin core archive

Authors: Telfer et al.
Data type: occurrences
Brief description: Darwin core archive of 2015 *rare* species inventory
Filename: Suppl materials 5 - Darwin Core Archive.zip - Download file (1.05 MB)

Suppl. material 6: Contributors list

Authors: Telfer et al.
Data type: authors
Brief description: A list of all contributors who took part in the collection and identification of specimens collected as part of the 2015 inventory.
Filename: Suppl materials 6 - Contributors.xls - Download file (43.00 kb)

Suppl. material 7: Human observations during rare BioBlitz

Authors: Telfer et al.
Data type: occurrences
Brief description: Human observations during *rare* BioBlitz, of mostly plants, birds, etc.
Filename: Suppl materials 7 - Species sightings.xlsx - Download file (23.87 kb)

Suppl. material 8: BIN representative tree

Authors: Telfer et al.
Data type: tree
Brief description: A neighbour-joining tree constructed from a single representative of each distinct BIN collected in *rare*, along with a single representative of clusters without BINs.
Filename: Suppl materials 8 - COI Tree.pdf - Download file (242.06 kb)

Suppl. material 9: BIN image library

Authors: Telfer et al.
Data type: images
Brief description: A collection of representative images of each BIN collected from the *rare* Charitable Research Reserve. BINs are listed in the same order as the tree. Specimens without BINs are not included.
Filename: Suppl materials 9 - Tree Images.pdf - Download file (163.93 MB)

Suppl. material 10: Final combined inventory for rare Charitable Research Reserve

Authors: Telfer et al.
Data type: checklist
Brief description: The final combined inventory for *rare* Charitable Research Reserve as of August 2015; including previous checklist and all 2015 species added.
Filename: Suppl materials 10 - Final Inventory.xlsx - Download file (328.53 kb)

Suppl. material 11: Raw data for accumulation curve

Authors: Telfer et al.
Data type: occurences
Brief description: Lot and BIN data was downloaded for each specimen that received a BIN from BOLD Systems. It was formatted for input into EstimateS (Version 9.1.0) for creation of an accumulation curve.
Filename: Suppl materials 11 - Accumulation Curve data.xlsx - Download file (477.00 kb)

Suppl. material 12: Sampling and new record images

Authors: Telfer et al.
Data type: images
Brief description: Images of sampling sites, sampling techniques, specimen processing, and three new provincial spider reccords.
Filename: Suppl materials 12 - Sampling and Specimen Images.pdf - Download file (1.16 MB)