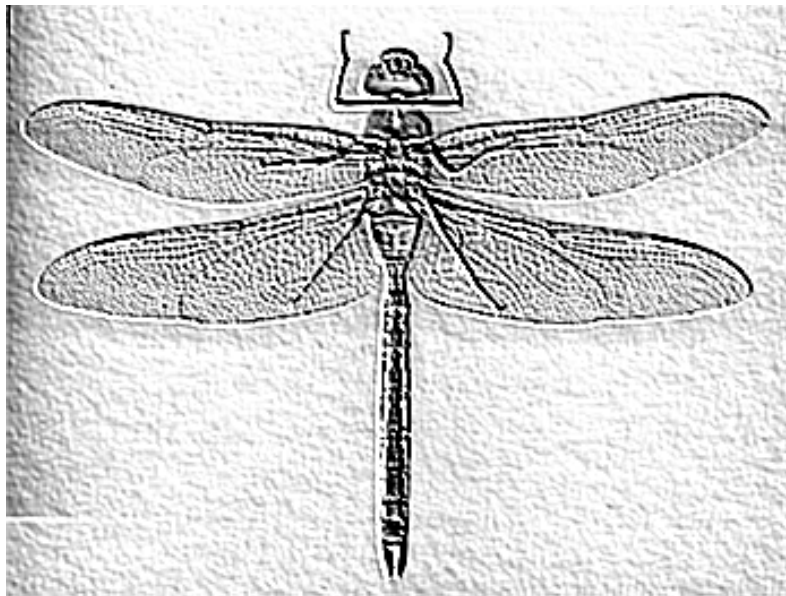


Manitoba Dragonfly Survey

Citizen's Monitoring Guide



Year VII
June 2005

Manitoba Dragonfly Survey

*Citizen's Monitoring Guide**

James R. Duncan, Ph.D.

Year VII

April 2005

The Manitoba dragonfly survey is a project of
the Wildlife and Ecosystem Protection Branch, Manitoba Conservation
Box 24, 200 Saulteaux Crescent, Winnipeg, MB R3J 3W3

*Contains material modified with permission from the 1998 Citizen's Monitoring Guide by Janet C. Rith-Najarian, Ph.D.,
Northern Minnesota Dragonfly Survey Project, The Rivers Council of Minnesota.



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OTHER DOCUMENTS ALSO AVAILABLE ...

- DRAGONFLY COLLECTING GUIDELINES
- HOW TO ESTABLISHING A DRAGONFLY SURVEY SITE and DATA SHEETS
- SPECIES CHECKLISTS



WHAT IS A DRAGONFLY?

The dragonflies (suborder Anisoptera) and the damselflies (suborder Zygoptera) together make up the order Odonata. In this booklet both suborders are referred to as “dragonflies.” They are ancient and distinctive insects. They have many primitive insect features, such as unspecialized chewing mouthparts, but they also have specialized body parts reflecting their aerial and predatory habits. For example, their eyes have up to 25,000 lenses that give the insect nearly 360-degree vision. They can spot flying prey – mosquitoes and deerflies – and plot an intercept course from 20 meters away. While they beat their wings only up to 30 times per second (other insects can beat their wings more than 1,000 times per second), they have been clocked flying at more than 50 kph and can make a 90-degree turn at full speed without banking. Their nearest living relatives are probably the Ephemeroptera (mayflies). It is estimated that about 90 dragonfly species occur in Manitoba.

WHAT THE SURVEY IS ALL ABOUT

Dragonflies have been used as indicator species for assessing habitat and water quality in a variety of wetlands, riparian forests, and lakeshore habitats around the world. Scientists in Europe, Japan and the U.S. have had good success in establishing citizen monitoring networks to collect data for regional or national dragonfly survey and environmental monitoring projects. Teachers, school groups, nature societies, and other interested citizens groups or individual volunteers have been recruited for these projects. Monitoring guides are made available to recruits so that data is recorded and specimens are collected according to survey standards. Over the course of several years, the data and specimens collected usually result in the compilation of local dragonfly atlases and field guides, as well as contributing to an international database. Inspired by the success of a dragonfly survey now underway in Minnesota, we decided to initiate a dragonfly survey here.

Significant efforts have been made in assessing the diversity of dragonflies in Manitoba, especially in urban areas. Many questions remain, however, about the occurrence of dragonfly species throughout the province. The results of this survey will be compiled in a dragonfly atlas and field guide, and will become part of the Conservation Data Centre database. The results will also contribute information to the database and mapping project of the Dragonfly Society of the Americas and the Odonata information network of the Worldwide Dragonfly Association. A detailed Manitoba dragonfly atlas



and field guide will be one of the products of the survey. Interested volunteers are invited to become involved to help us achieve these goals. Survey participants in all areas of the province are welcome.

SURVEY ORGANIZATION

The Manitoba Dragonfly Survey, based in Winnipeg, is being coordinated by Jim Duncan. We would like to encourage your continued feedback to evaluate this guide book and the methods described. Your efforts are greatly appreciated. Please send your comments, data and specimens to Dragonfly Survey, Manitoba Wildlife and Ecosystem Protection Branch, Box 24, 200 Saulteaux Crescent, Winnipeg, MB R3J 3W3, Telephone: 204-945-6998, email: jduncan@gov.mb.ca

SURVEY OBJECTIVES

- 1) To survey and inventory Manitoba dragonflies.
- 2) To compare dragonfly diversity in undisturbed, disturbed, or managed habitats.
- 3) To identify uncommon dragonfly species and to determine if specific habitats are important for their conservation.
- 4) To cooperate with other monitoring efforts in Manitoba and elsewhere.

EQUIPMENT NEEDED TO PARTICIPATE

The equipment you will need to survey dragonflies is minimal. The most important things are:

- 1) An insect collecting net, which can either be purchased or made.
- 2) Specimen envelopes or packets, which can be purchased or made.
- 3) Forms for reporting data.
- 4) Colour or other field keys for identifying common or distinctive species, at least to family level.
- 5) A field notebook.
- 6) Other equipment you may find useful: Camera, binoculars, hip waders or boots, hat and other protective field clothing, acetone (for preserving specimens).



HOW TO MAKE A COLLECTING NET

Professional insect collecting nets can be purchased from a number of scientific supply companies. However, it is easy and inexpensive to make a net using materials obtainable at a local hardware store. To make your own net you will need the following:

- A wooden dowel or metal conduit pipe handle, about 2 cm diameter and at least 1 meter long. A longer handle makes it easier to catch fast high-flying dragonflies.
- A length of stiff wire, about 1 meter long.
- One square meter of sturdy netting, preferably green or black.
- Duct, hockey, or electrical tape.
- Strong thread and a needle.

Bend the wire into a hoop shape, and leave the last 2 inches on each end bent out. The wire hoop may now be attached to the handle. The wire tips of the hoop should be inserted into the conduit pipe; or, if you are using a wooden dowel, place the wire tips alongside the edge. You may prefer to drill out two holes in the end of the wooden dowel in which to insert the wire tips of the hoop. Once the ends of the hoop have been inserted into the end of the pipe or dowel, add strips of duct tape to secure the wire in a figure-8 or spiral wrap.



Now you are ready to construct the "bag" of the net using the thread and the netting. Fold the square of netting in half, so that it has the shape of a rectangle. Knot the thread well, and begin sewing across one of the narrow ends of this rectangle. When you reach the end of this first side, continue sewing up the adjacent longer side. When you reach the end of this side, you will have three sides of the net "bag" ready: one side is a fold, and two sides have been sewn. Now turn the bag inside out, so that the rough seams are inside. Next, take the hoop and wrap the first inch or two of the open end of the bag around the hoop wire, tucking the overlapped ends inside the hoop. You may want to pin the net bag in place around the hoop wire. Sew the overlapped edge to the body of the bag, securing the wire hoop inside a casing. Finish sewing the hoop seam with a sturdy knot. Voila! Now you have a net of your own.



HOW TO CATCH DRAGONFLIES

Once you have a net in hand, you are ready for action! Catching adult dragonflies can be a tricky business, even if you do have a good net. If your net is long-handled and the bag is long enough to flop over the edge of the hoop when you flip it, then you will have an advantage.

Dragonflies have keen eyesight, and are always on the look-out for food, predators, or other dragonflies. If your net is light coloured or flaps around a lot, you could be mistaken for a predator and the dragonfly will avoid you. However, if you stalk the dragonfly while crouching low and hold the net much like you would hold a tennis racket, with the end of the bag in one hand so that it doesn't flap, you will be less noticeable. You will also find that stalking dragonflies is easier when they are perched rather than flying, or when they are at water and are distracted by patrolling a territory, looking for a mate, or laying eggs.

When you are within range (within the length of the net handle), quickly sweep at it from the side using a stroke like a back-hand in tennis. Dragonflies are quick fliers and can easily fly up and out of the bag, so you will need to make a quick flick of your wrist in order to make the end of the bag flop over the rim of the net hoop and secure the dragonfly inside.



Dragonfly wings are sturdier than butterfly wings and will not lose "scales" when they are fluttering inside the net or when you handle them. However, with prolonged vigorous beating of their wings against the inside of the net, or while you are holding them, it is possible for the wings to catch on something and rip. To avoid damage, you will want to remove a dragonfly quickly and carefully from your net, then hold it securely while examining it.

First, from the outside of the net, gently pinch both sets of wings into a position folded back over the thorax. Still pinching from the outside with one hand, carefully reach into the net with your other hand until you reach the dragonfly's body. Slip its wings into the crook between your index finger and middle finger, and carefully remove the dragonfly from the net. As long as you have all four wings folded back and between your two fingers, the dragonfly will not be able to escape or tear its wings. Now you can easily examine your catch, identify the species and release it, or slip it into a paper collecting envelope for later examination or preservation.

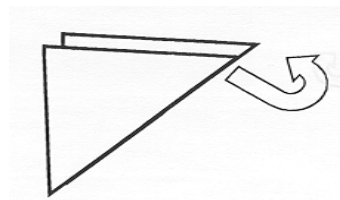
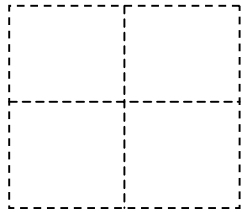


HOW TO MAKE COLLECTING ENVELOPES

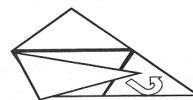
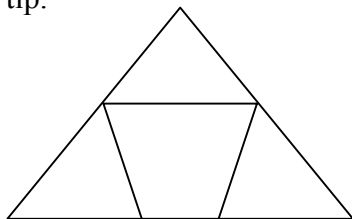
While you may often use the catch-and-release method of dragonfly identification, we encourage you to save a couple of representative specimens of each species you observe in an area for later identification and preservation for the survey reference collection. In fact, preserved specimens (or good quality photographs of the side, top and front view of the dragonfly) are needed to validate an occurrence record and to establish a species' distribution in Manitoba. Otherwise, these records are denoted as observed or reported. Once the specimen's identification is confirmed, the specimen (or photograph) can be returned to the collector for a personal reference collection.

While you are doing fieldwork, the safest way to store live specimens is to insert them into glassine (like postage stamp envelopes), wax, or paper envelopes and place them in a cooler. Although you can order collecting envelopes from scientific supply houses, it is easy to find suitable alternatives or to make your own. The glassine envelopes that are usually used by stamp collectors will also work well for live dragonflies, and are available at hobby shops and at the Post Office. Waxed paper sandwich bags or letter envelopes will also work for larger specimens.

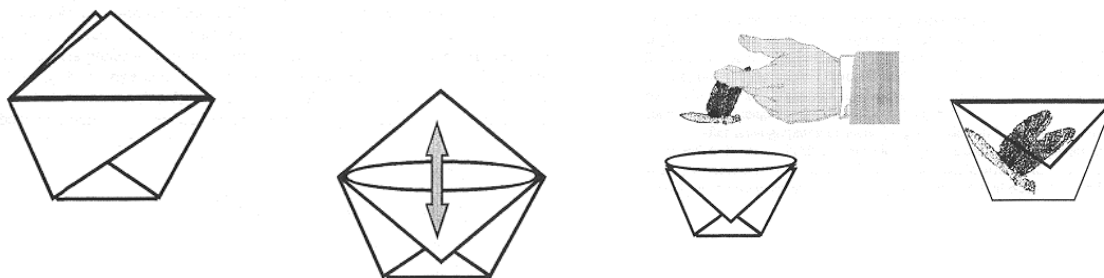
The least expensive option is to make your own collecting envelopes out of waxed or regular paper. All you need to do is rip off a sheet that is as long as it is wide, and tear or cut that square into smaller squares. Larger species will need envelopes made from larger squares, but usually you can get four squares from a standard letter-sized paper. Taking one of the squares in hand, fold it in half along a diagonal. You will now have a triangle:



Next, with the fold at the bottom, crease three lines within the triangle. Then, taking the left triangle tip, fold along the crease line and place the tip at the middle of the opposite side, and repeat with the right triangle tip.



There will now be two flaps remaining on what used to be the top of the original folded triangle. Take each flap and fold it down onto opposite sides of what is now becoming the opening of your paper packet. Now you are ready to place the dragonfly inside the packet. Make sure all four wings are folded over behind its thorax before sliding it gently into the envelope. Finally, fold both top flaps over to one side to prevent the dragonfly from escaping.



This collecting packet can now be placed in a container until later when you are able to work with your dragonfly specimen. I use a small plastic recipe card box with a hinged snap lid. Be sure to number the packet and record appropriate data for it in your field notebook.

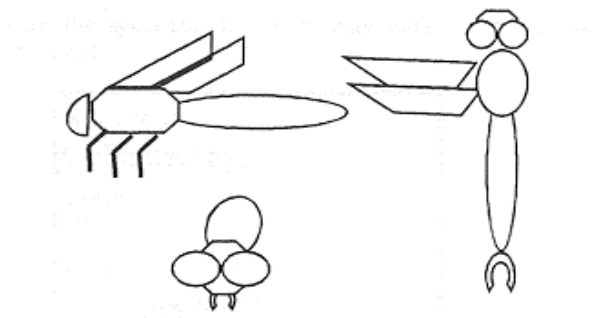
STORING SPECIMENS FOR LATER STUDY

After you return from the field, you will need to store your envelopes of collected dragonflies in a refrigerator. For specimens that are unfamiliar and not readily identifiable, it may be necessary to spend some time viewing them under magnification and keying them out. Fortunately, after dragonflies have been cooled for several hours, they become lethargic and can easily be examined.

Dragonflies can rest in your refrigerator for 2 to 3 days without harm. In addition to being able to examine them while they are in an inactive state, it is also possible to photograph them for a photographic collection. After you have examined and identified it, and after the dragonfly has been cooled for several hours, place it outdoors on a branch or rock. Arrange its body and wings in a normal resting or perching stance, and photograph it from angles that best capture key features (see drawing next page). Be aware that small dragonflies can warm up quickly on hot days, especially in the sun. I recently lost a very small dragonfly attempting to photograph it. It flew to freedom within a minute before I could focus the camera!



Dragonflies may have key markings on any one of their three important angles (front, side, or top), hence you should aim your camera at the most distinguishing features.



If you have more than one specimen of the same species, you could even arrange them so that you can capture different angles and different sexes or life stages of the same species in one shot. Make sure you have adequate lighting and that your camera is able to zoom in for a close-up in focus photograph. After photographing or identifying dragonfly specimens, release them back to the same habitat from which they were collected.

PRESERVING SPECIMENS AND RECORDING DATA

To preserve specimens for a permanent collection, arrange them carefully within envelopes, and set them aside for a few hours so that they eliminate feces in their digestive tract. This results in better colour preservation. Cut off the bottom corners of the envelopes just enough to tap out the feces. Place the envelopes in a tightly sealed jar of acetone overnight or for at least 12 hours. Acetone dissolves lipids and more readily dries specimens, but the fumes are toxic and it should be used with caution. Remove the envelopes with tweezers and air-dry them in a well ventilated place. A simpler method of preserving specimens is placing envelopes with specimens in a well-sealed plastic bag, and freezing them. After the dragonflies have been frozen, they can be air-dried.

For a permanent collection, specimens should be placed in glassine or cellophane display envelopes. Placement in display envelopes should be in the same position as in the collecting envelopes: with wings folded back over the thorax. Standard dragonfly display envelopes may be ordered from biological supply companies. Contact me for information on suppliers.



Included with the specimen in the display envelope should be the following information on a 3" X 5" card:

Species: *use the scientific and common name (see checklist)*

Collected by: *name of person who caught the specimen*

Coll. Date: *date and time the specimen was captured*

ID: *refers to who confirmed the identification of the species*

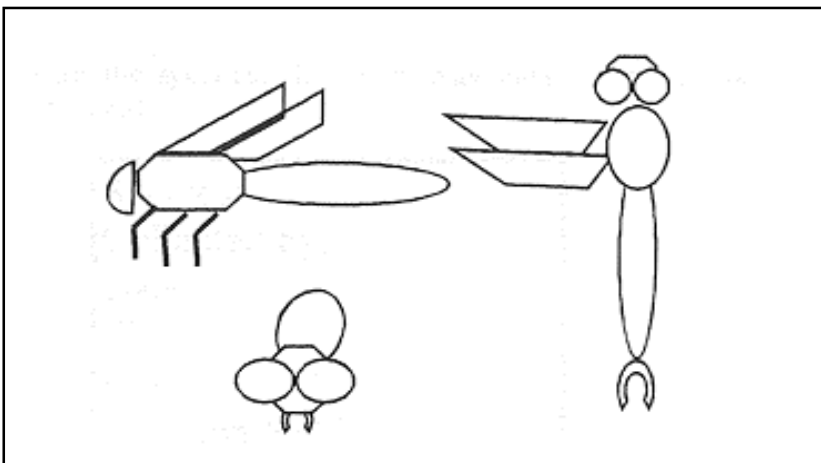
ID Date: *date the specimen was identified by the above person*

Location/Habitat: *provide as many details as possible, lat/long, legal description, UTM coordinate, or distance N/S and E/W of nearest town or landmark. Also include specifics of the site location and type of habitat.*

Description/Behaviour: *for example, "seen hunting mosquitoes."*

You may want to sketch in pertinent features on a drawing on the back of the card. The next two templates can be photocopied onto cardstock to create display cards for specimens.

Species:
Collected by:
Coll. Date:
ID:
ID Date:
Location/Habitat:
Description/Behaviour:



Some collectors still like to display pinned dragonflies in cases, but specimens often become more brittle with age, and the wings and tails break easily. Envelope storage is preferable.

Collection of specimens from any location in Manitoba will be useful in documenting and expanding Manitoba records for our database. Specimens and data from a variety of locations you may visit during your travels throughout Manitoba are important for this survey. Also very useful to our survey are regular visits to an established monitoring site. A separate handout with detailed instruction on establishing a survey site is available upon request.

HOW TO IDENTIFY DRAGONFLIES

There are several thousand dragonfly species in the world, and an estimated 90 species in Manitoba. For those interested in serious collecting, taxonomy and identification can be an interesting challenge. However for those just starting out, species identification can seem overwhelming and frustrating. Habitat and behaviour cues can help narrow the possibilities, but physical features are most helpful. You will want to get a good look at the dragonfly from 3 different angles: side, front, and top. Note such features as: **Body** size, colour, shape, and markings; wing colour, venation, and markings; **eye** position and colour; **leg** colour; and **abdominal appendages**.

These features will help you identify your specimens. If you cannot identify them, you can sketch or photograph whatever features seem to be most distinguishing. Use this guide to identify dragonfly specimens to family, or even genus, if not actually to species. Your identification can be confirmed by providing me with the specimens. Specimens and information on damselflies are also wanted, although only one distinct species are denoted in this guide.

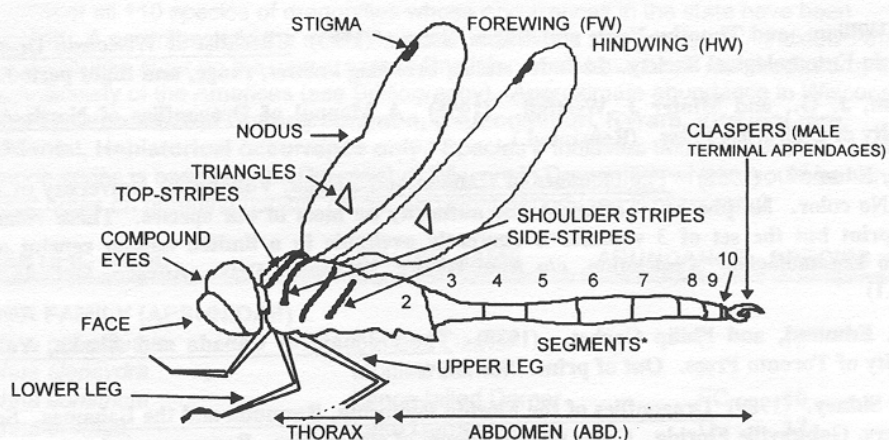
Some important differences distinguish damselflies from dragonflies. Damselflies are small, delicate, often fluttery-winged cousins of dragonflies, often folding their wings back over their abdomens when at rest. Their body colours are often bright or metallic. Males have four abdominal appendages, females two. The eyes are small and set apart. Dragonflies are generally much larger and are strong fliers. They may not rest as often, but whenever they are perched their wings are held perpendicular to their bodies. They may be brightly coloured, even metallic, or very dull and camouflaged. Dragonfly eyes are usually relatively large. Males have three abdominal appendages, females only two.



Males and females may be divergent in size (males are sometimes larger) and colour (females may be paler). Females often have a prominent ovipositor, which helps them lay eggs in plant tissue and substrate, while males have a noticeable genital bump on the underside of the second segment of the abdomen. Note that juveniles (recently emerged dragonflies) can look distinctly different from adults.

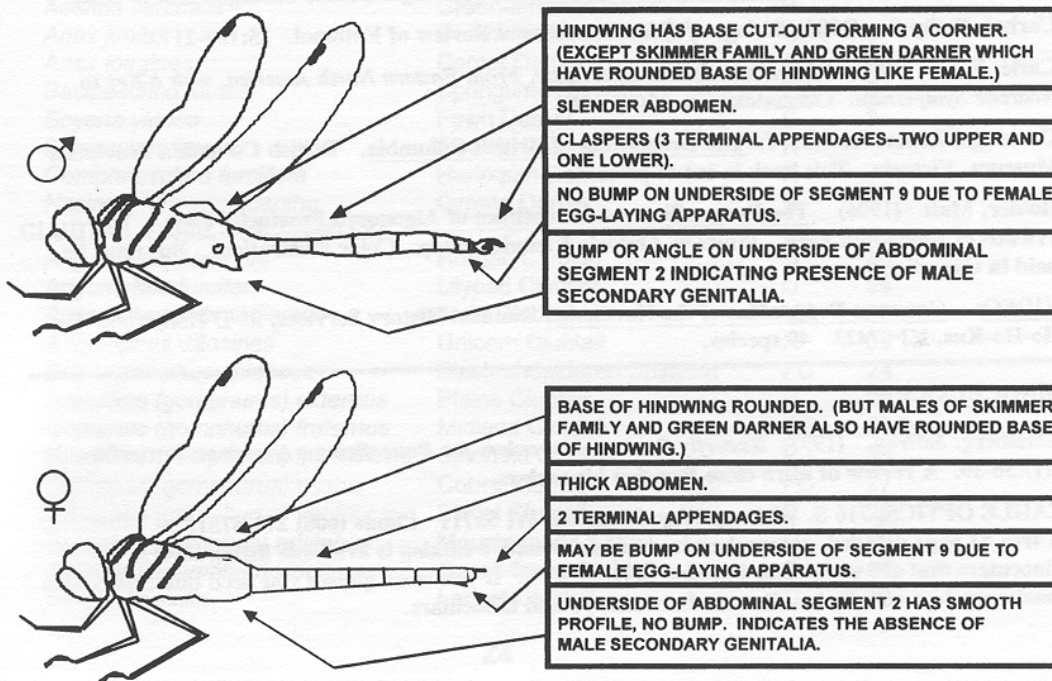
DRAGONFLY ANATOMY

PARTS OF A DRAGONFLY



*COUNT ABDOMINAL SEGMENTS BACKWARDS FROM TINY SEGMENT 10.

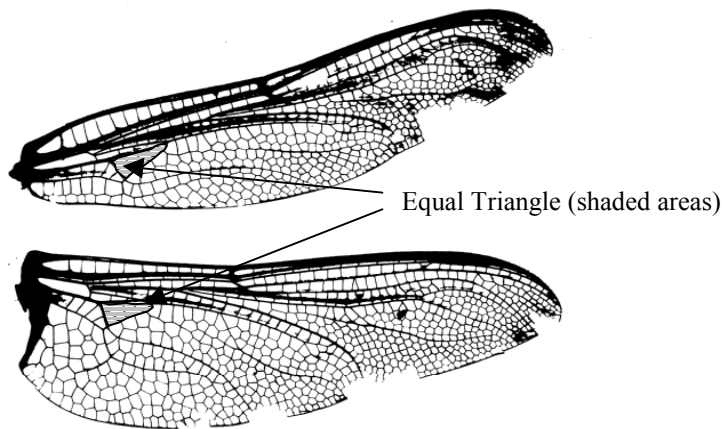
SEX DIFFERENCES



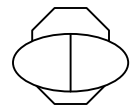
SIX DRAGONFLY FAMILIES

Most dragonflies can be directly identified to species without first determining family. However, determining family can be helpful and guards against error. Three families, the darners, clubtails and spiketails, have a triangle pattern in the wing veins of the forewing and hindwing that are similar in shape. The other three families, the cruisers, emeralds and skimmers have different shaped triangles in the forewing and hindwing.

THREE DRAGONFLY FAMILIES HAVE A TRIANGLE PATTERN IN THE WING VEINS WITH THE TRIANGLES OF THE FOREWING AND HINDWING SIMILAR IN SHAPE.



DARNER FAMILY (*Aeshnidae*): EYES MEET ON TOP OF HEAD AND ARE IN CONTACT FOR A DISTANCE



Large dragonflies, up to 12.5 cm wing span. Long and slender with very large, often brilliant blue, eyes. They are strong fast flyers seen mostly in late summer. Voracious predators, they feed mostly at twilight when they fly constantly. Most of the day is spent resting in a vertical position. Female Darners have an ovipositor which allows them to insert eggs into underwater plant tissues. Folklore portrays them as frightening “darning needles” but they are actually harmless (although they can bite if handled incorrectly).

CLUBTAIL FAMILY (*Gomphidae*): EYES WIDELY SEPARATED ON TOP OF HEAD



Medium-sized dragonflies with black and yellow markings in young becoming pale green in adults. Named for the expanded end segments of the abdomen although some species of Clubtails do not have any club. Conversely, some dragonflies in other families also have expanded end of abdomen, such as some Emeralds or the Cruiser family. Female Clubtails generally have a smaller club than the male. The Clubtail family is actually defined not by the club, but by widely separated eyes. These dragonflies are active over water but perch often. When feeding they are sedentary, sitting horizontally on the ground, rocks, logs, etc. and making short, rapid, sallies after prey. Their complex colouration makes them difficult to spot except when moving. Females do not have an ovipositor but lay eggs, unaccompanied by the male, in oxygen-rich flowing waters of streams and rivers.

SPIKETAIL FAMILY (*Cordulegastridae*): EYES MEET ON TOP OF HEAD AT A POINT

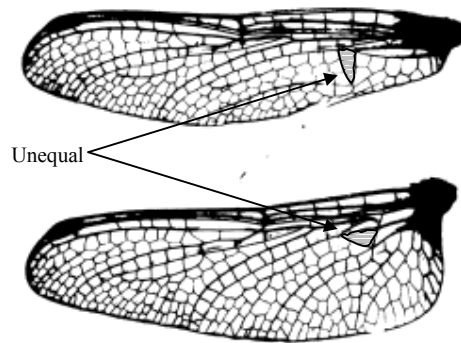


Long, slender dragonflies reminiscent of Darners, but the eyes meet at a point instead of a long seam. They have two light stripes on each side of the thorax. Adults have aqua coloured eyes. Males patrol along streams, flying long routes, looking for females. The female has a spike-like ovipositor which she uses to insert eggs, not in plant tissue, but in the bottom sediments of shallow water along the bank. She hovers over the water, plunging the abdomen vertically into the sediments.

NOTE: Species in this family have not been documented in Manitoba, but one species, the Twin-spotted Spiketail (*Cordulegaster maculata*) occurs nearby in northern Minnesota.



THREE DRAGONFLY FAMILIES HAVE A TRIANGLE PATTERN IN THE WING VEINS WITH THE TRIANGLES OF THE FOREWING AND HINDWING DIFFERENT IN SHAPE.



CRUISER FAMILY (*Macromiidae*): EYES ALWAYS TOUCHING



Only one species in this family, the Swift or Illinois River Cruiser (*Macromia illinoiensis*), has been documented in Manitoba. Cruisers are large and slender with narrow wings, and a single slanted pale side-stripe on the thorax. The body shape is similar to a Clubtail. They have two yellow stripes across the face. The males have powerful thoraxes and engage in long flights, patrolling along the shore. Pairs land in trees to mate. The females do not have ovipositors, but drag the end of their abdomen through water releasing eggs.

EMERALD FAMILY (*Corduliidae*): EYES ALWAYS TOUCHING



Emeralds are slender-bodied and darkly metallic with bronze or greenish highlights. Thorax often fuzzy in appearance. Many have bright green emerald-green eyes. Female lacks an ovipositor but some have a spout-shaped structure beneath the abdomen that helps lay eggs in mud. The largest genus is *Somatochlora*, the Striped Emeralds. Another group, the Baskettails, are quite common, emerging in late spring in large numbers in just a few days.

SKIMMER FAMILY (*Libellulidae*): EYES ALWAYS TOUCHING



Some of our commonest and showiest dragonflies. Small to medium bodies, often blue, red or yellow with a stout triangular-shaped abdomen tapered at the tip. This is our largest dragonfly family making up one third of Manitoba's species. Many are colourful and have patterned wings. Most of these species breed in stagnant waters. They can be seen flying over ponds, perching often. Some develop a whitish powdery bloom on their body as part of their adult colouration. Females drop eggs in the water, alone or in tandem with a male, or while a male guards her from other males.



CHECKLIST OF MANITOBA ODONATA *

(Dragonflies and Damselflies)

* derived from DRAGONFLIES OF MANITOBA - A SPECIES LIST WITH ELEVEN NEW RECORDS by MARJORIE HUGHES, 110 Lanark Street, Winnipeg, MB R3N 1L1 and JAMES R. DUNCAN Wildlife and Ecosystem Protection Branch, Manitoba Conservation, Box 24, 200 Saulteaux Crescent, Winnipeg, MB R3J 3W3

The current Manitoba list has 96 species of dragonflies from nine families. Thirteen new species have been recorded in the province since the Manitoba Dragonfly Survey began in 1999 and are noted in the list with an asterisk (*). Abbreviations are used in the text for directions (n north, se southeast, etc.) col. for collector, MM for Manitoba Museum, CDC for Conservation Data Centre, Man. for Manitoba and Prov. for Provincial. The nomenclature is based on the list of scientific and common names adopted by the Dragonfly Society of the Americas. A species list should always be considered as a work in progress. As our knowledge of the dragonfly fauna increases, changes to this list will certainly be made. More collecting is needed in many geographic regions, especially the north, and in many types of habitat.

ORDER ODONATA

Suborder ZYGOPTERA – Damselflies (26 species)

Family Calopterygidae – Broad-winged Damsels

Genus Calopteryx

River Jewelwing – *C. aequabilis* Say, 1839 – common, s Man. n to Grand Rapids.

Ebony Jewelwing – *C. maculata* (Beauvois, 1805) – rare, extreme se Man. recorded once from Waugh.

Family Lestidae – Spreadwings

Genus Lestes

Spotted Spreadwing – *L. congener* Hagen, 1861 – uncommon, s Man. n to Grindstone Prov. Park.

Northern Spreadwing – *L. disjunctus* Selys, 1862 – common throughout Man. n to Gillam.

Emerald Spreadwing – *L. dryas* Kirby, 1890 – common, s Man. n to The Pas.

Sweetflag Spreadwing – *L. forcipatus* Rambur, 1842 – probably common, s Man (this species is taxonomically very similar to *L. disjunctus*, which leads to problems with identification).



Elegant Spreadwing* – *L. inaequalis* Walsh, 1862 — rare, e of Lee River 18-VII-1999 col. Ray Tuokko ♂ (CDC Collection), Lyons Lake 16-VII-2001 col. Lance Barber (♀ CDC collection).

Slender Spreadwing – *L. rectangularis* Say, 1839 — uncommon, se Man. to Winnipeg and Bird Lake.

Lyre-tipped Spreadwing – *L. unguiculatus* Hagen, 1861 — common, s Man. n to St. Laurent.

Family Coenagrionidae – Pond Damsels

Genus Amphiagrion

Eastern Red Damsel – *A. saucium* (Burmeister, 1839) — rare, known only from Treesbank (Aweme), col. E.Criddle VI-1911(J.B.Wallis Collection) and bog near Gull Lake 8 VII 2000, col. J.Duncan (♀♂♂ CDC collection).

Genus Chromagrion

Aurora Damsel – *C. conditum* (Selys, 1876) — rare, Ft. Whyte Nature Centre.

Genus Coenagrion

Prairie Bluet – *C. angulatum* Walker, 1912 — uncommon, western s Man., n to The Pas.

Subarctic Bluet – *C. interrogatum* (Selys, 1876) — status uncertain, n Man. The Pas to Wabowden.

Taiga Bluet – *C. resolutum* (Selys, 1876) — common, throughout Man.

Genus Enallagma

Boreal Bluet – *E. boreale* Selys, 1875 — common, s and central Man. to York Factory.

Tule Bluet – *E. carunculatum* Morse, 1895 — uncommon, s eastern Man. to Winnipeg and Bird Lake.

Familiar Bluet – *E. civile* (Hagen, 1861) — common, locally abundant in the Red River Valley n to Victoria Beach and e to Sandilands Prov. Forest.

Alkali Bluet – *E. clausum* Morse, 1895 — uncommon but with local abundance, sw Man., n to Victoria Beach and The Pas.

Northern Bluet – *E. cyathigerum* (Charpentier, 1840) — common, throughout s and central Man. n to Gillam.

Marsh Bluet – *E. ebrium* (Hagen, 1861) — common, s Man. n to The Pas.

Hagen's Bluet – *E. hageni* (Walsh, 1863) — common, s Man. n to The Pas.



Genus *Ischnura*

Plains Forktail – *I. damula* Calvert, 1902 — rare, Ft. Whyte Nature Centre, Victoria Beach and Whiteshell Prov. Park.

Western Forktail – *I. perparva* Selys, 1876 — rare, Ft. Whyte Nature Centre and Winnipeg Beach.

Fragile Forktail – *I. posita* (Hagen, 1861) — status uncertain, one specimen from Ft. Whyte Nature Centre.

Eastern Forktail – *I. verticalis* (Say, 1839) — fairly common, se Man. to Winnipeg and Victoria Beach.

Genus *Nehalennia*

Sedge Sprite – *N. irene* (Hagen, 1861) — common throughout s Man. n to The Pas.

Suborder ANISOPTERA – Dragonflies (68 species)

Family Aeshnidae -- Darners

Genus *Aeshna*

Canada Darner – *A. canadensis* Walker, 1908 — common throughout Man. n to Wabowden.

Lance-tipped Darner – *A. constricta* Say, 1839 — common throughout s Man. n to Dauphin.

Lake Darner – *A. eremita* Scudder, 1866 — common throughout Man. n to York Factory.

Variable Darner – *A. interrupta* Walker, 1908 — common throughout Man. n to about 56°N.

Sedge Darner – *A. juncea* (Linnaeus, 1758) — status undetermined, from se corner of Man. n to Churchill.

Azure Darner – *A. septentrionalis* Burmeister, 1839 — status undetermined, extreme n along the Hudson Bay coastline.

Zigzag Darner – *A. sitchensis* Hagen, 1861 — common throughout Man. n to Churchill.

Subarctic Darner – *A. subarctica* Walker, 1908 — uncommon throughout Man.

Black-tipped Darner* – *A. tuberculifera* Walker, 1908 — rare, Narcisse CP (pond) VI- 1993 col. “TAC/TCG” (♀ J.B.Wallis Collection) Star Lake, Whiteshell Prov. Park 29-VII-2001 col. D.R.Collicutt (♂ CDC collection).

Shadow Darner – *A. umbrosa* Walker, 1908 — common throughout Man.



Genus Anax

Common Green Darner – *A. junius* (Drury, 1773) – common throughout s Man. n to about 50°N.

Genus Basiaeschna

Springtime Darner – *B. janata* (Say, 1839) – uncommon in extreme se corner of Man., Whiteshell Prov. Park and Pinawa.

Genus Boyeria

Fawn Darner – *B. vinosa* (Say, 1839) – uncommon, occurs only in extreme se corner of Man. all records within Whiteshell Prov. Park.

Family Gomphidae – Clubtails

Genus Arigomphus

Horned Clubtail – *A. cornutus* (Tough, 1900) – uncommon, se Man. and w to Winnipeg, the Red River and the La Salle River.

Genus Dromogomphus

Black-shouldered Spinyleg* - *D. spinosus* Selys, 1854 – rare, 1 km n of Oak Hammock marsh 9-VIII-1992 (♂♀) col. J.Diawol and Sandilands Prov. Forest 2 km e of Marchand 3-VII-1993 (♂) col. J.Diawol (specimens in J.B.Wallis collection).

Genus Gomphus

Lancet Clubtail – *G. exilis* Selys, 1854 – uncommon, se Man. from Lyons Lake to Berens River.

Plains Clubtail – *G. externus* (Hagen in Selys, 1858) – uncommon but with local abundance Red River valley n to Winnipeg Beach, Assiniboine River w to Treesbank.

Midland Clubtail – *G. fraternus* (Say, 1839) – fairly common along Winnipeg River and Lake Winnipeg n to Berens River. Manitoba also has a distinctive smaller pale type of this species which Walker recognized as a subspecies *G. fraternus manitobanus*. It was found on the Red River at Winnipeg and on the Assiniboine River at Treesbank.

Pronghorn Clubtail – *G. graslinellus* Walsh, 1862 – rare, across s Man. to about 50°10' N.

Dusky Clubtail – *G. spicatus* Hagen in Selys, 1854 – rare to uncommon due to limited range, extreme se Man., Whiteshell and Nopiming Prov. Parks.

Cobra Clubtail* - *G. vastus* (Walsh, 1862) – rare, Jessica Lake, Whiteshell Prov. Park. 6-VII-1953 col. R.D.Bird (♀♀ J.B.Wallis collection) Silver Falls (Winnipeg River) 13-VII-2000 col. John Markert (♀♀ CDC collection)



Genus Hagenius

Dragonhunter – *H. brevistylus* Selys, 1854 – common, se Man. n to Berens River.

Genus Ophiogomphus

Boreal Snaketail – *O. colubrinus* Selys, 1854 – fairly common, from se Man. to Gillam.

Rusty Snaketail – *O. rupinsulensis* (Walsh, 1862) – rare to uncommon, across s Man. n to about 50°10' N.

Genus Stylurus

Riverine Clubtail* – *S. amnicola* (Walsh, 1862) – rare, recorded on the Assiniboine River from Holland MB to Winnipeg and on the Red River at Winnipeg.

Elusive Clubtail – *S. notatus* (Rambur, 1842) – rare, s Man. n to The Pas.

Family Cordulegastridae – Spiketails

Genus Cordulegaster

Twin-spotted Spiketail* – *C. maculata* Selys, 1854 – rare due to limited distribution in extreme se Man., Sandilands Prov. Forest 17-VI-1989 (♂) col. R.N.Brandt and 7-VI-1990 (♀) col. T.D.Galloway/DCH/ACT also an exuvia from Falcon Lake 23-VI-1991 col. T.D.Galloway (specimens in J.B.Wallis collection).

Family Macromiidae – Cruisers

Genus Didymops

Stream Cruiser* – *D. transversa* (Say, 1839) – uncommon due to limited distribution in se Man., collected from May 22 to June 29 by several collectors (M.Hughes, D.Colicutt, G.Vidal and L.Barber) Whiteshell and Nopiming Prov. Parks(11♂, 4♀ specimens in CDC and MM collection).

Genus Macromia

Swift River Cruiser – *M. illinoensis* Walsh, 1862 – rare to uncommon due to limited distribution, se Man. n to Berens River.

Family Corduliidae – Emeralds

Genus Cordulia

American Emerald – *C. shurtleffii* Scudder, 1866 – common throughout Man.



Genus *Dorocordulia*

Racket-tailed Emerald* – *D. libera* (Selys, 1871) — uncommon, Hansen Creek 11-VII-1978 col. T.D.Galloway, (J.B.Wallis Collection) Winnipeg, 9-VI-2001 col. H.Mueller and others on dragonfly field trip, Star Lake, 4-VI-2000 col. D.R. Collicutt, Lyons Lake 8-VII-2001 col. L. Barber, w of Pinawa 17-VI-1999 col. J.Duncan and Rabbit River, Nopiming Prov. Parks, 22-VI-2001 col. G.Vidal (3♂, 6♀, specimens in CDC collection).

Genus *Epitheca*

Beaverpond Baskettail – *E. canis* (McLachlan, 1886) — uncommon, Whiteshell Prov. Park and Sandilands Forest Reserve, also Riding Mountain National Park, Dauphin and Swan River.

Common Baskettail* – *E. cynosura* (Say, 1839) — rare in Man. due to limited range, near se border, West Hawk Lake 1-VII-1989 col. A.J.Mackay (♀ J.B.Wallis collection) Star Lake 10-VII-1999 col. D.R.Collicutt and Lyons Lake 7-VII-2001 col. L.Barber (2♂ specimens in CDC collection).

Spiny Baskettail – *E. spinigera* (Selys, 1871) — common, s and central Man. to Flin Flon.

Genus *Somatochlora*

Ringed Emerald – *S. albicincta* (Burmeister, 1839) — status undetermined, recorded at Churchill, probably occurs throughout n Man.

Lake Emerald – *S. cingulata* (Selys, 1871) — status undetermined, recorded from Gillam and other points n, probably occurs throughout n Man.

Plains Emerald – *S. ensigera* Martin, 1906 — rare to uncommon, s Man., recorded at Lockport, Starbuck, McCreary, Onah, Westbourne and Brokenhead River.

Forcinate Emerald – *S. forcipata* (Scudder, 1866) — status undetermined, recorded only from The Pas, probably occurs in n Man.

Delicate Emerald – *S. franklini* (Selys, 1878) — common, throughout Man.

Hudsonian Emerald – *S. hudsonica* (Hagen in Selys, 1871) — status undetermined, recorded from Norway House and Churchill, probably occurs throughout n. Man.

Kennedy's Emerald – *S. kennedyi* Walker, 1918 — uncommon, recorded from Winnipeg n to Norway House.

Ocellated Emerald – *S. minor* Calvert in Harvey, 1898 — status undetermined, recorded from s Man. n to Gillam.

Muskeg Emerald – *S. septentrionalis* (Hagen, 1861) — status undetermined, a species of the far north, recorded from Churchill.



Brush-tipped Emerald – *S. walshii* (Scudder, 1866) — rare to uncommon, recorded from Winnipeg, Star Lake and Dauphin, probably occurs in the north also.

Whitehouse's Emerald – *S. whitehousei* Walker, 1925 — status undetermined, recorded at Churchill, probably occurs throughout northern Man.

Williamson's Emerald – *S. williamsoni* Walker, 1907 — rare, limited distribution in Man., recorded from Winnipeg Beach, Gull Lake and Pinawa.

Genus *Williamsonia*

Ebony Boghaunter – *W. fletcheri* Williamson, 1923 — rare, s eastern Man., recorded from “Lake Winnipeg” in 1890. ⁸ Rediscovered at Agassiz Prov. Forest 20+22-V-1980 col T.D.Galloway (♂♀ J.B.Wallis Collection).

Family Libellulidae – Skimmers

Genus *Leucorrhinia*

Boreal Whiteface – *Leucorrhinia borealis* Hagen, 1890 — fairly common, s Man. n to The Pas.

Frosted Whiteface – *L. frigida* Hagen, 1890 — fairly common, se Man., southern interlake area.

Crimson-ringed Whiteface – *L. glacialis* Hagen, 1890 — fairly common, s. Man.

Hudsonian Whiteface – *L. hudsonica* (Selys, 1850) — common throughout Man.

Dot-tailed Whiteface – *L. intacta* (Hagen, 1861) — common, s Man. n to Dauphin.

Canada Whiteface – *L. patricia* Walker, 1940 — status undetermined, n Man. recorded from Gillam and Churchill.

Belted Whiteface – *L. proxima* Calvert, 1890 — common throughout Man.

Genus *Libellula*

Chalk-fronted Corporal – *L. julia* Uhler, 1857 — common, s Man. n to Swan River.

Widow Skimmer* – *L. luctuosa* Burmeister, 1839 — rare or accidental, one record from n Winnipeg, 31-VII-1983 col. D.Pollock (♂ J.B.Wallis collection).

Common Whitetail* – *L. lydia* Drury, 1770 — rare, first records in Winnipeg in 2001 col. J.Duncan, more records: Ste. Adolphe, 30-VI-2002 reported by Andy Courcelles and La Salle River at La Barriere Park, 13-VIII-2002, col. M.L.Hughes (♂ in CDC collection). Recent sightings indicate that it may be expanding its range into s Man.

Twelve-spotted Skimmer – *L. pulchella* Drury, 1773 — common, s Man. n to about 51°N.



Four-spotted Skimmer – *L. quadrimaculata* Linnaeus, 1758 – common, s Man n to The Pas.

Genus *Pachydiplax*

Blue Dasher – *P. longipennis* (Burmeister, 1839) – rare, one record from Lac du Bonnet.

Genus *Pantala*

Wandering Glider – *P. flavescens* (Fabricius, 1798) – rare, a migratory species, range includes s Man. n to Gimli.

Spot-winged Glider – *P. hymenaea* (Say, 1839) – rare, a migratory species, only two records, Gimli and Victoria Beach.

Genus *Sympetrum*

Variegated Meadowhawk – *S. corruptum* (Hagen, 1861) – common, s Man. to The Pas.

Saffron-winged Meadowhawk – *S. costiferum* (Hagen, 1861) – common, s Man. n to The Pas.

Black Meadowhawk – *S. danae* (Sulzer, 1776) – common throughout s Man. n to Wabowden.

Cherry-faced Meadowhawk – *S. internum* Montgomery, 1943 – common, s Man. n to The Pas.

Red-veined Meadowhawk – *S. madidum* (Hagen, 1861) – rare, w Man. n to about 54°N.

White-faced Meadowhawk – *S. obtrusum* (Hagen, 1867) – common, s Man. n to The Pas.

Band-winged Meadowhawk* – *S. semicinctum* (Say, 1839) – rare, s Man., Spirit Sands, Spruce Woods Prov. Park, 21-VIII-1999 (♂) col. J.Duncan, Star Lake 2-IX-2001 (♂) col. D. R.Collicutt and N.W.Angle Prov. Forest 28-VIII-2001 (♀) col. C.Hamel and E.Reimer (specimens in CDC collection).

Autumn Meadowhawk* -- *S. vicinum* (Hagan, 1861) – uncommon, recorded in southern Manitoba from Wallace Lake (Nopiming), Pinawa and Winnipeg.

Note: Previous lists for Manitoba may have included the Green-striped Darner (*Aeshna verticalis*), Cardinal Meadowhawk (*Sympetrum illotum*) and Ruby Meadowhawk (*Sympetrum rubicundulum*). We have not been able to locate specimens to confirm these records and have concluded that they were reported erroneously. The Cardinal Meadowhawk is known in Canada only from British Columbia's south coast. New research regarding the genus *Sympetrum* has made it easier to identify the difficult little red meadowhawks, including *Sympetrum rubicundulum*. The Ruby Meadowhawk is extremely difficult to distinguish from Cherry-faced and White-faced Meadowhawk unless the identifier is very familiar with these species and has access to good references. This probably was the reason for the previous report. Similarly the Green-striped Darner is very difficult to distinguish from the very common Canada Darner. The Green-striped Darner is known only from southern Ontario and the Maritime provinces.



BIBLIOGRAPHY

- Abott, J.C. 2005. Dragonflies and Damselflies of Texas and the South-Central United States: Texas, Louisiana, Arkansas, Oklahoma, and New Mexico. Princeton University Press. Princeton, NJ. 424 p.
- Cannings, R.A. 2002. Introducing the Dragonflies of British Columbia and the Yukon. Royal British Columbia Museum. Victoria, BC. 96 p.
- Conroy, J.C. and J.L. Kuhn. 1978. New annotated records of Odonata from the province of Manitoba with notes on their parasitism by larvae of water mites. *The Manitoba Entomologist* 11:27-40.
- Corbet, P.S. 1999. Dragonflies, Behaviour and Ecology of Odonata. Cornell University Press. Ithaca, NY. 850 p.
- Dunkle, S.W. 2000. Dragonflies through binoculars. Oxford University Press. Oxford, UK. 266 p.
- Legler, K. and D. Legler. 1998. Color Guide to Common Dragonflies of Wisconsin. Revised Ed. Sauk City, WI. Not paginated.
- Mead, K. 2003. Dragonflies of the North Woods. Kollath - Stensaas Publishing. Duluth, MN. 203 p.
- Nikula, B., J. Sones, D. Stokes and L. Stokes. 2002. Stokes Beginner's Guide to Dragonflies and Damselflies. Little, Brown and Co. Boston, MA. 159 p.
- Rith-Najarian, J.C. 1998. Citizen's Monitoring Guide for the Northern Minnesota Dragonfly Survey Project. 1st Ed. Not paginated.
- Walker, E.M. 1953. The Odonata of Canada and Alaska. Volume 1. Part I: General, Part II: The Zygoptera – Damselflies. University of Toronto Press. Toronto, ON. 292 p.
- Walker, E.M. 1958. The Odonata of Canada and Alaska. Volume 2. Part III: The Anisoptera – Four Families. University of Toronto Press. Toronto, ON. 318 p.
- Walker, E.M. and P.S. Corbet. 1975. The Odonata of Canada and Alaska. Volume 3. Part III: The Anisoptera – Three Families. University of Toronto Press. Toronto. ON. 307 p.
- Westfall, M.J., Jr. and M. L. May. 1996. Damselflies of North America. Scientific Publishers. Gainesville, FL. 649 p.



SELECTED SPECIES ACCOUNTS

The following section provides photographs, descriptions and brief natural history notes of selected Manitoba dragonflies. Species accounts are grouped by family and are preceded by a summary of diagnostic characteristics of that family. More species' accounts will be added over the next few years. Note that in some of the photographs that follow, the dragonfly specimen's wings are folded back above the body (page 21). This is not how they appear on a live dragonfly in a natural resting posture (page 30). Only damselflies hold their wings folded back when at rest (page 34).

Conservation Data Centre Status Ranks are presented for each species. The ranks are defined as follows:

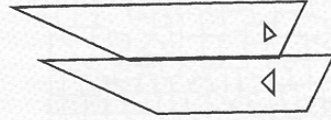
G	Global Status Rank
S	Provincial Status Rank
?	Estimated rank
S1	Very rare
S2	Rare
S3	Uncommon
S4	Widespread, abundant, and apparently secure; may be of long-term concern
S5	Demonstrably widespread, abundant, and secure
S#S#	Numeric range rank; denotes range of uncertainty about the status

For more information on the ranking system, please visit the Manitoba Conservation Data Centre's web page at <http://web2.gov.mb.ca/conservation/cdc/>

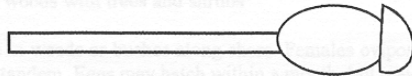


**FAMILY AESHNIDAE—
“Darners”**

**FOREWING AND HINDWING
CLEAR, MARKED WITH
TRIANGLES ROUGHLY EQUAL IN
SIZE, STRONG FLIERS**



**EYES ALWAYS VERY LARGE
AND CLOSELY TOUCHING,
OFTEN BRILLIANT BLUE**



**LARGE BODY USUALLY WITH BRIGHT
BLUE OR GREEN, OFTEN SPOTTED
AND STRIPED WITH BROWN OR
BLACK SHAPE LIKE A DARNING
NEEDLE, WITH WIDE HEAD, LARGE
EYE AND NARROW CYLINDRICAL
TIP AND SMALL PADDLE-LIKE
APPENDAGES**



Common Green Darner (*Anax junius* Drury, 1773)

Family: Aeshnidae



Adult male



Adult female

Prevalence: Uncommon but widespread in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Secure (S5).

Description: Large darner with spear-shaped body, stout bright green thorax and males with bright blue abdomen without distinct black spotting, abdomen reddish in females and juveniles, transparent wings nearly as long as abdomen. Larvae have lateral spines and large prominent eyes.

Flight Period: Usually mid- to late May, August to late September.

Range: Throughout North America, including southern Manitoba (Treesbank, Clear Lake – RMNP, Brandon, Matlock, Gunton, Balmoral, Beausejour, Winnipeg).

Aquatic Habitat: Still, slowly moving, shallow brackish water, heavily vegetated ponds, slow streams, and sheltered bays of lakes, with emergent, submerged and floating plants. Prefers low percentage of clay and higher percentage silt and sand in substrate.

Terrestrial Habitat: Fields, open areas, bogs, open woods with trees and shrubs.

Life Cycle and Natural History: Couples mate in weeds or bushes along shore. Females lay eggs into water lilies and emergent plants, with male in tandem. Eggs may hatch within a month, but may over winter if laid late in the season. Larvae have elongated cylindrical bodies, and cling onto submerged vegetation or debris. Larval lifespan lasts up to 2 years. New adults emerge mid-summer, fly far a field to mature, and return to breeding places after several weeks. Mature adults may migrate south for the winter, and many adults also migrate north in the following spring to reproduce, although migration patterns are poorly understood. Some will emerge in Manitoba in early spring, reproduce, and die in late summer without migrating.



Canada Darner (*Aeshna canadensis* Walker, 1908)

Family: Aeshnidae



Prevalence: Widespread and locally abundant in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Secure (S5).

Description: Large dark spear-shaped body nearly 7.5 cm (3 inches) or more in length, transparent wings nearly as long as abdomen, black abdomen with bright blue spots and no tubercles or bumps under first segment of abdomen, black thorax with two jagged blue-green stripes, first stripe hooked on top with small spot between stripes. Female may have two narrow abdominal appendages plus an ovipositor. Larvae have lateral spines and large prominent eyes, dorsal abdominal streaking.

Flight Period: Late June and early July, to late September. Populations peak in forests mid-July, at water in August.

Range: Mixed boreal forests in the holarctic region, including British Columbia, east to Nova Scotia and south to New England, West Virginia, Illinois, Minnesota, Wisconsin, and Washington State.

Manitoba records include Aweme, Beausejour, Birch River & Hgwy #1, Brokenhead River & Hgwy #1, Clear Lake - RMNP, Duck Mountain, Husavick, Lake Atikameg, Pinawa, Pine Creek (sw of Wampum), Sandilands, The Pas, Treesbank, Victoria Beach, Westbourne, Winnipeg.

Aquatic Habitat: Still, marshy or boggy lakeshores or ponds, sluggish streams, sphagnum bogs. Tolerates substrate pH as low as 5.4.

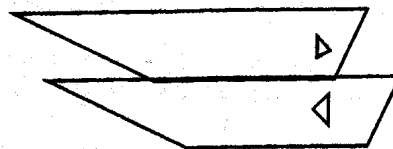
Terrestrial Habitat: Open woods not far from water, more in mixed hardwood/conifer forests, sunny forest edges, rarer in prairie and open areas.

Life Cycle and Natural History: Larvae have elongated cylindrical bodies, and cling onto rushes and sedges or submerged vegetation or debris. Emergence occurs in late June. Adults fly far a field to mature, and return to breeding places after several weeks. Adults at rest hang from twigs and trees, feed mostly at twilight. Males patrol shorelines, drop down into emergent vegetation to mate. Females oviposit in open marshes, into stems of submerged plants. Eggs may hatch within a month, but may over winter if laid late in the season.



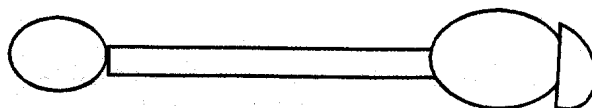
GOMPHIDAE—
“Clubtails

FOREWING AND HINDWING
MARKED WITH TRIANGLES
ROUGHLY EQUAL IN SIZE,
STRONG FLIERS



EYES NOT TOUCHING AND
VERY WIDE SET

MEDIUM TO VERY
LARGE DARK BODY
WITH STOUT THORAX
AND CLUBBING AT
TIP OF ABDOMEN



Pronghorn Clubtail (*Gomphus graslinellus* Walsh, 1862)

Family: Gomphidae



Prevalence: Very rare in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Sensitive (N3); Manitoba = Very Rare (S1).

Description: An early summer species characterized by a peculiar “switchback” flight. Mid-sized body about 6 cm (2 ¼ inches) long, green thorax striped with two equal-sized broad brown stripes, clear wings with brown veins, wingspan about 7.5 cm (3 inches). Wide club tail with two yellow spots on each side, black abdomen with yellow triangular spots, square yellow dorsal spot on last abdominal segment. Widely separated eyes. Lance-shaped larvae have wide sprawling legs with short twisted tibiae, hair fringes, burrowing hooks for digging.

Flight Period: Emerge late May, abundant in June, fly to mid-August.

Range: Southwestern Ontario to British Columbia, south to Washington State, Minnesota, Missouri, Kansas, Arkansas, and Oklahoma. In southern and eastern parts of Canada, abundant but localized; rare west of the Dakotas. Manitoba records include Aweme and Fort Whyte Nature Reserve -- Winnipeg.

Aquatic Habitat: Slow streams, ponds, or lakes with woods adjacent, grassy edges, rushes, other emergent plants, gentle current and unpolluted, oxygen-rich water, often clay, mud or sand substrate and banks. Prefers water pH above 7.5, does not tolerate silt in substrate above 17%.

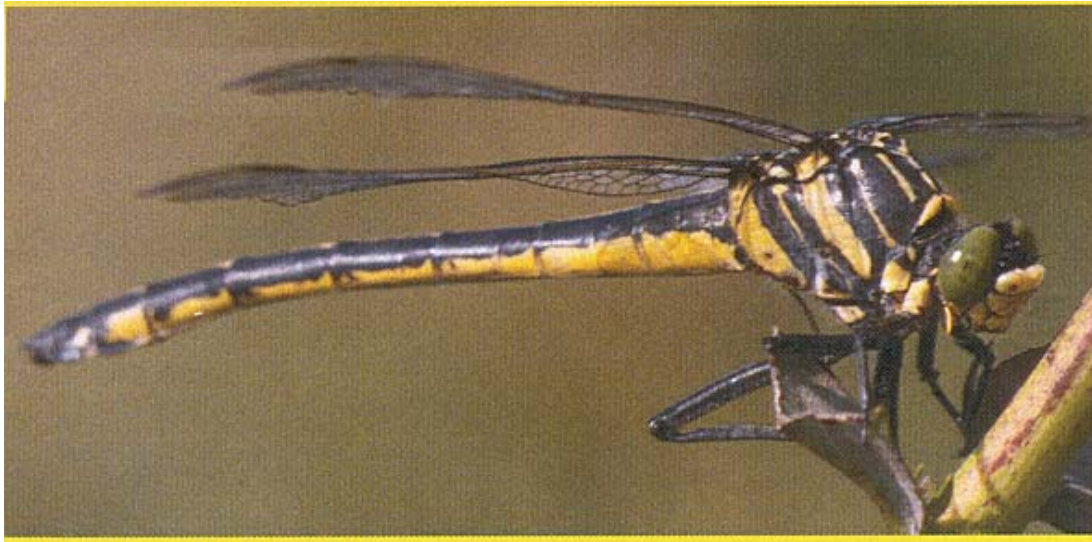
Terrestrial Habitat: Thick multi-layered woods along steep shaded banks, sometimes in sunny openings in mixed coniferous and oak or hardwood forests.

Life Cycle and Natural History: Larvae are wedge-shaped and dorso-ventrally flattened. Larvae burrow into clay, with tip of abdomen up in water to breathe. Emergence occurs at dawn, on an open bank or on low plants close to water. After mating, females oviposit unattended, often near steep banks, flying over water and tapping the surface irregularly, releasing 30-50 eggs per dip.



Dragonhunter (*Hagenius brevistylus* Selys, 1854)

Family: Gomphidae



Prevalence: Apparently secure and widespread in eastern Manitoba with intermediate abundance. Less common to rare west and south of the Pre-Cambrian Shield.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Apparently Secure (S4S5).

Description: Very large, strong and stout with bright yellow and black double-striped thorax. Widely separated green eyes. Males fly out over open water, with tip of abdomen curled down. Larvae have wide legs, short twisted tibiae, hair fringes, burrowing hooks for digging.

Flight Period: Mid-late June to late August.

Range: Nova Scotia to eastern Manitoba, south to Florida, Kentucky, Kansas and Texas. Most common in Pre-Cambrian Shield. In southern and eastern parts of Canada, abundant but localized. Manitoba records include Berens River, Black River at Highway 304, and Starr Lake.

Aquatic Habitat: Moderate to fast streams, forest rivers, protected and shady lakeshores, rocky channels. Needs flowing unpolluted oxygen-rich water, usually absent from small lakes and ponds, marshes, and bogs. Prefers high sand content, with percentage of silt in substrate below 20%.

Terrestrial Habitat: Forested areas with sheltered openings and shoreline thickets, rocky or shrubby forest margins. May travel far from water, flying furtively through ground cover and shrub layer.

Life Cycle and Natural History: Larvae are large (up to the size of a quarter), dark and flattened. Unlike other Gomphids, larvae sprawl in roots or herbaceous and woody debris along shore. Prefer sandy bottoms, into which they may burrow up to 2.5 meters. Larval lifespan is 4 years or more. At emergence, may crawl several meters on shore or up banks. Adult females oviposit unattended, flying far out over open water and tapping the surface irregularly while letting waves wash egg clusters into water, or hover near shoreline or banks and drop eggs from above.



COMMON NAME: Twin-spotted spiketail

FAMILY: Cordulegastriidae

CORDULEGASTRIDAE—

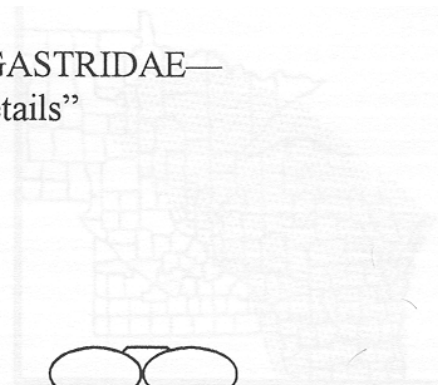
“Spiketails”

PREVALENCE: RSO = 1, local distribution with low abundance in northern Wisconsin

NATURAL HERITAGE STATUS:

Total = 04, Wisconsin = 34,

not listed in Manitoba



EYES BARELY TOUCHING IN A FIGURE—8 CONFIGURATION



spiketail, short legs, long dark abdomen with paired yellow spots, eyes are aqua-colored and just barely meeting at center in a figure-8 shape unlike widely spaced compound eyes. Female has long spikey ovipositor. Larvae large and hairy with oval abdomen, labium with very jagged teeth.

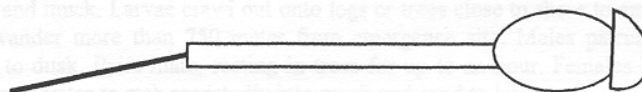
FLIGHT PERIOD: Late May to early August

RANGE: from Sordis and Chippewa west to Minnesota and Wisconsin. Rather common in the northern region.

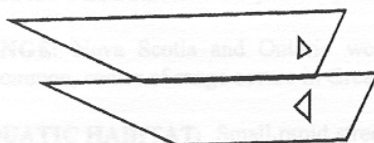
AQUATIC HABITAT: Small streams in woods, often in rocky areas.

TERRESTRIAL HABITAT: Forests, forest edges, trees close to water, shady narrow roads through woods.

LIFE CYCLE: Larvae prefer pools in rapid streams, do not burrow but rest on substrate, often becoming encrusted with silt and mud. Larvae crawl out onto logs or rocks close to water. After emergence, does not wander more than a few inches. Larvae spend most of day along shoreline beds and morning to dusk. Larvae are active in the water. Female flies over shallow water, use long ovipositor to stab repeatedly into mud and sand to lay eggs.



FOREWING AND HINDWING MARKED WITH TRIANGLES ROUGHLY EQUAL IN SIZE

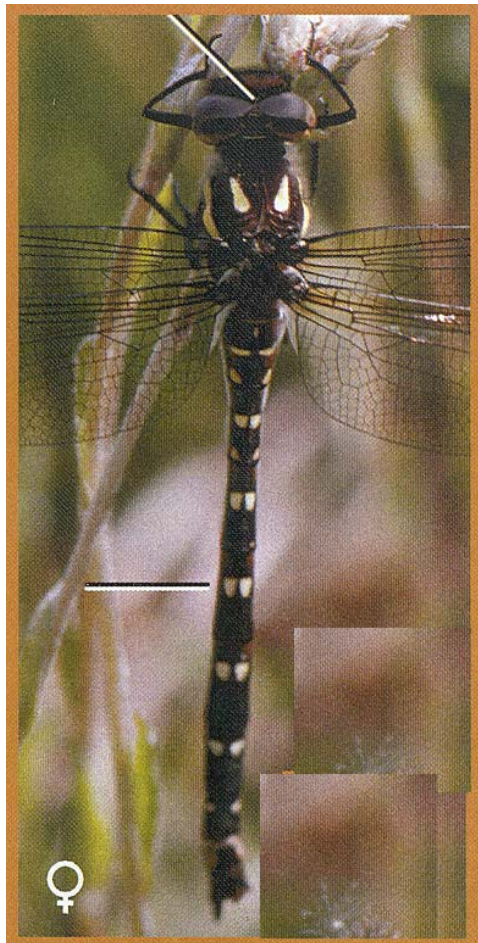


MEDIUM TO LARGE SLENDER BLACK AND YELLOW BODY, WITH CYLINDRICAL ABDOMEN; FEMALE HAS A SPIKE-TAILED OVIPOSITOR



Twin-spotted Spiketail (*Cordulegaster maculata* Selys, 1854)

Family: Cordulegastridae



Prevalence: Very rare in Manitoba. In Minnesota, it has a localized distribution with low abundance.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Very Rare (S1).

Description: Large black and yellow body about 7.5 cm (3 inches) long. Has two broad yellow thoracic stripes, broad apostrophe-like spots on shoulders, short legs, long dark abdomen with paired yellow spots, eyes are aqua-coloured and just barely meet at center in a figure-8 shape unlike widely spaced gomphid eyes. Female has long spiky ovipositor. Larvae large and hairy with oval abdomen. Labium with very jagged teeth.

Flight Period: Late May to early August.

Range: Nova Scotia and Ontario west to Minnesota. South to Arkansas and Texas. Rather uncommon, the center of its range occurs in the Great Lakes region.

Aquatic Habitat: Small rapid streams in woods, clear water, soft muck and sand substrate.

Terrestrial Habitat: Forests, forest edges, trees close to water, shady narrow roads through woods.

Life Cycle and Natural History: Larvae prefer pools in rapid streams, do not burrow but rest on substrate, often becoming encrusted with silt and muck. Larvae crawl out onto logs or trees close to shore to emerge. After emergence, does not wander more than 750 meter from emergence site. Males patrol long shoreline territories mid-morning to dusk. Pairs mate, resting in trees for up to an hour. Females hover over shallow water, use long ovipositor to stab repeatedly into muck and sand to lay eggs.



AUTHOR: Walsh, 1962

COMMON NAME: Swift River Dragonfly

FAMILY: Macromiidae

MACROMIIDAE— “Cruisers”

PREVALENCE: RSC = 1, localized distribution, low abundance in northern Minnesota. Best known and most widely distributed of *Macromia* species elsewhere in range.

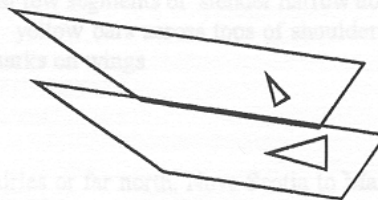
NATURAL RANGE: Global = Wisconsin = 94; 100%



EYES ALWAYS TOUCHING

DESCRIPTION: Larvae are very distinct, with a blotchy color pattern, long spider-like legs, dorsal abdominal hooks, head has frontal horn. Adult is large, dark, with metallic green coloring, more than 2 1/2" long, with swift flight, emerald eyes. Black spots on thorax, black spots on first 3-4 segments of slender narrow abdomen, and large black spots on abdomen, yellow markings on sides of abdomens, and single yellow spots on thorax, no dorsal stripe, no marks on legs.

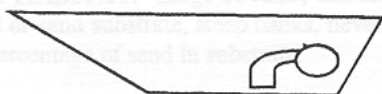
FOREWING AND HINDWING
MARKED WITH UNEQUAL
TRIANGLES



FLIGHT PERIOD: Late June to early September.

RANGE: Temperate, not common in Canada, not in practice of far north, but common in Manitoba, south to Georgia and Mississippi, west to Kansas.

AQUATIC HABITAT: Large streams, channels, or deep lakes with current or wave action, clean water, mud or sand substrate, sandy or silty bottom in ponds. 75% high percentage of sand in soil of pond.

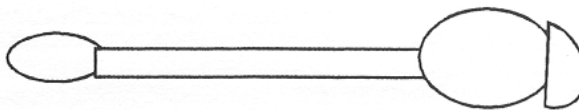


HIND WINGS HAVE “RIBS” BUT
NO “TOES”

TERRESTRIAL HABITAT: Open shores of large lakes, moist woods, mature mixed deciduous and coniferous, swampy areas. Migrate along river corridors and forest roads.

LIFE CYCLE: Larvae sprawl on sand or mud. After emergence, adults may wander long distances. Adults rest hanging vertically from tree branches, mate in tree branches also.

LARGE BODY, SHAPE
SIMILAR TO A
CLUBTAIL, COLORING IS
METALLIC, THORAX
WITH SIDE STRIPING,
ABDOMEN MARKED
WITH YELLOW



Swift River Cruiser (*Macromia illinoiensis* Walsh, 1862)

Family: Macromiidae



Prevalence: Rare, localized distribution with low abundance in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Very Rare to Rare (S1S2).

Description: Adult is large, dark with metallic green colouring, more than 6.5 cm (2 ½ inches) long with swift flight, emerald eyes, black and yellow body with smaller reduced spots on first few segments of slender narrow abdomen and large yellow spot and some clubbing at tip of abdomen, yellow bars across tops of shoulders, and single yellow side stripe on thorax, no frontal stripe, no marks on wings. Larvae are very distinct, with a blotchy colour pattern, long spider-like legs, dorsal abdominal hooks, head has frontal horn.

Flight Period: Late June to early September.

Range: Temperate, not common in Canada, not in prairies or far north. Nova Scotia to Manitoba, south to Georgia and Mississippi, west to Kansas. Manitoba records include Berens River and Starr Lake.

Aquatic Habitat: Large streams, channels, or deep lakes with current or wave action, clean water, mud or sand substrate, steep banks, never in ponds or stagnant water. Prefers water with pH above 7.5, high percentage of sand in substrate.

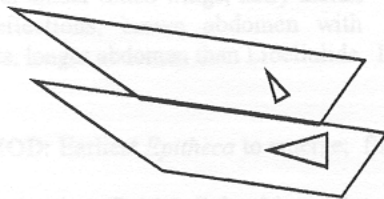
Terrestrial Habitat: Open shores of large lakes, moist woods, mature mixed deciduous and coniferous, swampy areas. Migrate along river corridors and forest roads.

Life Cycle and Natural History: Larvae sprawl on sand or mud. After emergence, adults may wander long distances. Adults rest hanging vertically from tree branches, also mate on tree branches.



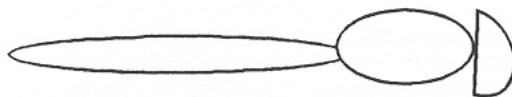
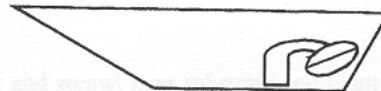
CORDULIIDAE— “Emeralds”

EYES ALWAYS TOUCHING
AND USUALLY BRILLIANT
GREEN



FOREWING AND HINDWING
MARKED WITH UNEQUAL
TRIANGLES

HIND WINGS HAVE
“RIBS” OR “TOES”,
SOMETIMES WITH
DARK SPOT AT BASE
OF WING



BODY IS MEDIUM TO
SMALL, USUALLY WITH A
FUZZY METALLIC
THORAX AND GENTLY
TAPERED ABDOMEN



American Emerald (*Cordulia shurtleffi* Scudder, 1866)

Family: Corduliidae



Prevalence: Widespread but not abundant in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Secure (S5).

Description: Compact, slender, metallic brassy bronze thorax with no markings, brilliant green eyes, dark tapered and cylindrical abdomen that is unmarked except for a thin white line at 2nd segment. Larvae similar to Libellulid larvae.

Flight Period: Early June to late August.

Range: Nearctic, Labrador to Alaska, south to New England, Pennsylvania, Wisconsin, Minnesota, Colorado, Nevada and California. Widespread, but not abundant, less common in southern part of its range. Manitoba records include Aweme, Churchill, Clear Lake - RMNP, Douglas Lake, Gillam, Mile 17 (Hudson Bay Railway), The Pas, Treesbank, Onah.

Aquatic Habitat: Slow cold water with low oxygen content, small forest lakes, bogs, swamps, beaver ponds, pools, sloughs with sandy or mucky bottoms, much plant debris and emergent vegetation.

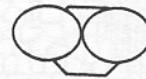
Terrestrial Habitat: Shady mature forests with sunny glades, multi-layered understory.

Life Cycle and Natural History: Males fly up to one meter above water, with sudden stops and turns. Female oviposits like a Libellulid, with rhythmic strikes on water at shore. Larvae crawl around in plant debris on top of substrate, transform to adults after 3 years.

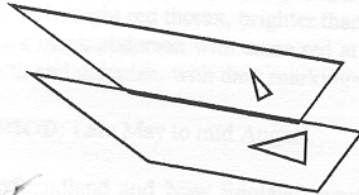


LIBELLULIDAE— “Skimmers”

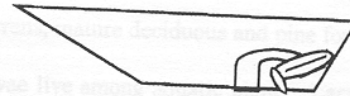
EYES ALWAYS TOUCHING



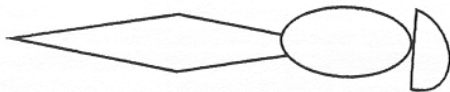
FOREWING AND HINDWING
MARKED WITH UNEQUAL
TRIANGLES



HIND WINGS HAVE
“RIBS” AND
“TOES” AND ARE
OFTEN SPOTTED



SMALL TO MEDIUM BODY,
OFTEN BLUE OR RED OR
YELLOW WITH A STOUT
TRIANGULAR ABDOMEN
TAPERED AT TIP



Saffron-bordered Meadowhawk (*Sympetrum costiferum* Hagen, 1861)

Family: Libellulidae (largest living and most recently evolved Odonata family)



Prevalence: Irregular distribution with locally high abundance in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Secure (S5).

Description: Largest of the meadowhawks, gold band on front edge of wings, yellow-gold body turning reddish with age, striped black legs.

Flight Period: Early July to late October.

Range: Nova Scotia and New England, west to British Columbia, south to Minnesota, South Dakota, Wyoming, Colorado and California. Manitoba records include Aweme, Brokenhead River & Hwy #1, Clear Lake Campground and Audy Lake Road – RMNP, Fort Whyte Nature

Reserve and Sturgeon Creek – Winnipeg, Jackfish Lake, w of junction of highways 10 & 45, St. Andrews on the Red River, 8 km north of junction of highways 4 & 10.

Aquatic Habitat: Ox-bows, sloughs, shallow creeks, swamps, marshy lakes, bogs, prefers alkaline water, tolerates more saline conditions.

Terrestrial Habitat: Prairie areas, scrub and woodlands, into adjacent forest areas, will wander along dirt roads.

Life Cycle and Natural History: Larvae are very active and develop quickly. Adults emerge en masse. Males accompany females during oviposition, but do not aggressively guard them.

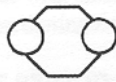
NB: This picture, compliments of Kurt Mazur, depicts a mating pair. The male (red) first transfers sperm from the end of his abdomen to the “secondary” genitalia on the underside of his 2nd abdominal segment. The male uses his legs to grasp the thorax of a flying female. He uses the claspers at the end of his abdomen to grasp the female behind her head. They are then flying in “tandem”. The female bends the end of her abdomen forward into what is called a mating “wheel” position (shown above) to connect with the male’s secondary genitalia. They may mate while flying or land to finish mating.



CALOPTERYGIDAE (*Zygoptera*)— “Jewelwing damselflies”

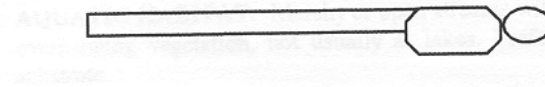
NATURAL HERITAGE STATUS: Wisconsin = 54;
not listed by Manitoba

DESCRIPTION: Large dragonfly-sized damselfly with shiny metallic green body, male has clear wings with dark brown spots. Female wings are smoky throughout. Both pair spot a small red spot on the forewing and a small red spot on the hindwing.



WIDE-SET EYES THAT ARE SMALLER
THAN THE DISTANCE BETWEEN THEM

DISTRIBUTION: Northwestern North America, south and west to Nebraska, Colorado, and Wyoming. May be at northwestern limits of its range in northern Minnesota.

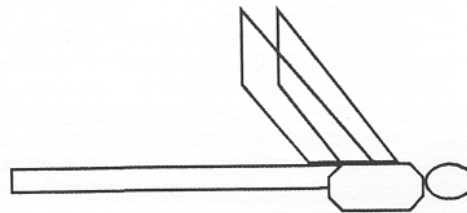


NARROW, DELICATE
CYLINDRICAL ABDOMEN,
SMALL THORAX AND HEAD,
BODY SIZE LARGER THAN
MOST DAMSELFLIES, CLOSE TO
DRAGONFLY SIZE

TERRESTRIAL HABITAT: Mature shady forests, not

LIFE CYCLE: Larvae develop over 2-3 years. Adult male does a courtship dance in flight in front of female. Female deposits eggs into plant tissues below surface of the water, may be submerged for up to 100 hours during oviposition.

WINGS UNSTALKED, HELD
FOLDED UP OVER ITS BACK,
FLUTTERY FLIGHT LIKE A
BUTTERFLY



River Jewelwing (*Calopteryx aequabilis* Say, 1839)

Family: Calopterygidae (suborder Zygoptera – Damselflies)



Prevalence: Locally common in Manitoba.

Conservation Data Centre Status: Global = Secure (G5); Canada = Secure (N5); Manitoba = Apparently Secure (S4).

Description: Large dragonfly-sized damselfly with slim metallic green body, male has clear wings with dark black tips, female wings are smoky throughout with small pale spots at tips.

Flight Period: Late May to late August.

Range: Northeastern North America, south and west to Nebraska, Colorado, and Wyoming, may be at northwestern limits of its range in range in Manitoba. Manitoba records include Brokenhead River & Hwy #1, Treesbank, Sandilands, and Winnipeg.

Aquatic Habitat: Marshy or open streams with intermittent rapids, often with mossy banks or overhanging vegetation, not usually at lakes. Prefers low silt and clay, high percentage sand in substrate.

Terrestrial Habitat: Mature shady forests, not in cleared areas.

Life Cycle and Natural History: Larvae develop over 2-3 years. Adult male does a courtship dance in flight in front of female. Female oviposits eggs into plant tissues below surface of the water, and may be submerged for up to ½ hour during oviposition.



ACKNOWLEDGEMENTS

I owe the start of my focused interest in dragonflies to my children, Connor and Brooke. Their intense curiosity about the “flying dragons” so abundant on our old farm homestead continues to be extremely contagious.

In 1997, when I first approached John Conroy for information about dragonflies in Manitoba, he generously shared data from his thousands of specimen records. Volunteers at the Conservation Data Centre transcribed those data into a digital format. Then in 1998, Wayne Steffens of Wisconsin, permitted me to join him on a day-long field trip in northern Minnesota and taught me how to catch and handle specimens. Despite a busy schedule, Wayne continued to answer my questions by email for many years.

John Conroy once again assisted me with the identification of the first specimens I collected in summer 1998. His encouragement and patience during that steep part of the learning curve was greatly appreciated. Terry Galloway, Bill Preston, and Rob Roughly provided me with data from their personal collections, loaned me valuable out-of-print reference books and/or copied hard-to-get journal articles. Janet Rith-Najarian catapulted the Manitoba survey with the generous donation of a copy of Minnesota’s reference material from their very successful dragonfly survey underway since 1994.

François Blouin, Patsy Duncan, Ron Larche, Bob Nero, and Peggy Westhorpe kindly reviewed early, and more cumbersome, drafts of this manuscript. It is much improved for their efforts. Pictures and illustrations have been adapted from Legler & Legler (1998) and Rith-Najarian (1998) unless otherwise noted.

More recently, three enthusiastic people have joined the quest, namely Joe Ackerman, Doug Collicutt and Marjorie Hughes. All have contributed immensely to the success of the Manitoba dragonfly project. Joe conducted detailed inventories of larvae in and around Winnipeg. Doug combined his professional training in biology with his extensive knowledge of the internet to create dynamic web pages on Nature North (<http://www.naturenorth.com/>) that communicate information about dragonflies in exciting new ways to a vast audience. Lastly Marjorie, who has been studying dragonflies for many years prior to this survey, has continued to share her expertise and time in such a way that makes this project entirely credible.

Lastly, the volunteer participants of the Manitoba Dragonfly Survey are the real champions. Their contribution of observations and specimens has lead to the discovery of 13 newly documented species in the province. The information attained has enabled us to assess the status of the 96 species found in Manitoba. The survey was one of a kind in its scope and culminated in Manitoba hosting a national workshop reviewing the status of all the dragonflies in Canada (<http://www.wildspecies.ca/>). The survey continues to provide the best information by which we can work toward conserving this charismatic group of insects and their habitats.



NOTES

