



Newfoundland and Labrador Odonate Survey Information and Protocol

This is a volunteer-based program and as such requires the dedication and commitment of people such as yourself to be successful. We would like to thank you in advance.

This survey requires the collection of specimens to ensure that the records are taxonomically accurate. There is no specific field guide for this program yet. We are trying to compile one now but it will not be ready for the season. There are several field guides that might be of interest to you, e.g. *Dragonflies through Binoculars*.

Site Selection

When participating in this survey we would like you to choose a site that you can visit throughout the summer. One site information form is fine but please include some weather and other habitat observations on an **Observation Form** for repeat visits. At your site choose a 30-meter stretch of shoreline or section of bog/marsh. Get a location either a Lat/Long from a map or a UTM from a GPS, don't forget the projection. When filling out the Site Information Form insure that you give the site a name (i.e. Pynn's Brook Road A), then a detailed description of how to get to the site (i.e. 2 Km in the road from the weight scales on the TCH).

Site Description

Once you have chosen a site collect as much habitat and ecological information as possible. Weather information should be recorded each day you are out surveying, these changes will affect your observations. Dragonfly and damselfly species each react to weather conditions differently. Cloud cover affects the amount of light, which in turn will affect odonate activity, record the percentage of cloud cover. Please note if there has been any precipitation in the last 24 hours, especially any storm conditions. The amount of wind will also affect dragonfly activity, using the Beaufort Scale below please record a measure for the amount of wind. Don't forget to record the temperature.

Beaufort Scale (wind speed in KPH)

- 0 smoke rises vertically (< 2Kph)
- 1 wind direction shown by smoke drift (2-5)
- 2 wind felt on face; leaves rustle (6-12)
- 3 leaves, small twigs in constant motion, light flag extended (13-19)
- 4 wind raises dust, loose paper, small branches move (20-29)
- 5 small trees in leaf sway, crested wavelets on inland waters (30-39)
- 6 large branches in motion, whistling heard in wires (40-50)

Habitat

Aquatic habitat information is the next bit of information to collect. Note whether it is a natural or man made water body. Describe the water body; circle one of the descriptors ie stream, small lake. Is this a temporary or a permanent water body? Is the water flowing or stand, you can comment on speed here. Describe any standing water by circling either *oligotrophic* (nutrient poor, usually deep rocky lakes with stratification), *mesotrophic* (healthy, adequate plant and plankton productivity), *eutrophic* (shallow, overly enriched with nutrients, algal blooms, low oxygen) or *dystrophic* (polluted, stressed by physical and or chemical inputs). Describe the water colour, its

depth (1-m from shore) and pH (acidic or alkaline if you know it). What is the substrate like. If possible record the water flow speed in other ecological notes, measure a known distance, ie choose a 5-m stretch of water time how long it takes for a leaf to flow down stream, then divide the distance by the time to get a speed of X m/s. Record any other ecological information that you feel is important to the site.

Now look at the vegetation. The terrestrial section is intended to describe the vegetation surrounding your study site. Is the aquatic habitat you are surveying a stream running through a forest or open field, perhaps a marsh in a very open area, or a stream running through a clearcut. Circle the appropriate descriptors. If your site is in a forested area describe the canopy and understory, how many layers are in each? Your site may have a layer of mature deciduous trees with a layer of young coniferous trees, in addition to a layer of shrubs and a layer or herbaceous plants. Describe the layers and list any species you recognise either by their common or scientific name. Now describe the vegetation directly along the shoreline and in the water. This section is pretty straight forward. The water plants along the shoreline can be described as *emergent* (ie cattails and reeds), *floating* (ie lily pads), or *submergent* (these are plants that do not break the surface of the water but are upright in the water column).

Sampling

After you have recorded all the site description information open your eyes and start looking, be prepared to get wet, 9 chances out of 10 your going to swim once throughout the summer when chasing dragonflies. We encourage you to attempt to collect adults, or larvae, but please no more than 4 of each specimen on a given day for adults and limit your larval collections to less than 10 larva throughout the summer. It would be useful for you to note tenerals (newly emerged or emerging adults) but due to their fragility and difficulty in preserving them please do not collect them. We also request that you do not collect specimens that are engaged in reproductive or egg laying activity. On your site information form or your observation form you should record all dragonflies observed, and collected and any relevant behaviours.

For each specimen you collect please fill out a specimen collection card and keep it with each specimen **separately**. Give each of your specimens an id number. The specimen number is **S-** followed by the initials of your **first and last name**, then **-2008**, and **-001** for your first specimen, 002 for your second, and so on, i.e. the ninth specimen collected by Jim Doe would be **S-JD-2008-009**.

Equipment

- Glassine/wax paper envelopes
- Empty peanut butter jar (large)
- Forceps
- Acetone/nail polish remover (with acetone)
- Aerial net (see instructions)
- Specimen labels
- Specimens mailer

Collecting Dragonflies

The following is based on <http://www.ups.edu/biology/museum/ODcollecting.html> "**Collecting Dragonflies (Odonata) and Maintaining a Collection**", by Dr. Dennis R Paulson, Director, Slater Museum of Natural History. Section 6 is for those who wish to maintain there own collection, however we do not advocate private collections, we request that you allow us to place your specimens into one of the recognised provincial collections:

Although not everyone will wish to do so, the best way to learn to identify dragonflies is by collecting them. Like butterflies, many species are easily identified in the field, but also like butterflies, some species may be identified only in the hand. The simplest way to learn their

identity is to capture one, identify it in the hand, then either release it or "collect" it for a reference specimen. Take care not to catch teneral (recently emerged individuals) they are very easily damaged if handled.

If you plan to collect specimens, there are procedures that you should follow so the specimens are of greatest value to you and to a larger collection to which you may someday donate them. There is little justification for killing a dragonfly except for education or research. At the same time, dragonflies are insects, the great majority of them are common, and there is little chance that scientific collecting affects their populations. Thus there is every justification for collecting dragonfly specimens to learn about them.

It's important to remember that "dragonfly" refers to the entire order Odonata, and is thus inclusive of damselflies. "Odonate" is also often used for members of this group.

If you wish to make a collection, here is a summary of the steps to follow to collect a dragonfly for a specimen:

- 1) Catch it.
- 2) Envelope it.
- 3) Acetone it.
- 4) Remove it.
- 5) Label it.
- 6) Store it.

CATCH IT (1)

Dragonflies are subject to predation, particularly by birds, and they are accordingly quite wary. They have quick responses and quick flight, so you must be even quicker. Even damselflies may move away rapidly, although they are sometimes easily approached. Dragonflies are considerably warier.

Perched dragonflies are probably easier to catch than those already in flight. If an odonate is perched in the open, just sweep the net sideways, trying to center the intended victim. If it is in dense vegetation, the best strategy is to come down from above, as a sideways sweep may just flip the vegetation out of the net, the insect with it. If it is perched on a stout branch, there is every chance you will knock it out of the net when you hit the branch, so extra thought may be needed to figure out your best capture strategy. After you catch it, lift the end of the net and the dragonfly will often fly up into it. Grasp the net below the dragonfly and turn it over so you can reach in and grab it. If you are very concerned about not losing it, grab it from outside the net first. They tend to fly up, and many a dragonfly has escaped instantly when the collector opens the bag to look inside!

For a dragonfly in flight, sweep sideways and quickly flip the net bag over, trapping it inside. It's always best to swing from behind and below, the area of poorest vision. Both feeding individuals and those in sexual patrol flights may fly a regular beat, so you can anticipate their flight path.

You can usually grab any dragonfly with impunity, but the larger ones have big mandibles and can pinch enough to generate four-letter words such as "ouch." Only a few of the largest species can actually draw blood when they bite, and you'll learn about them quickly enough (huge female spiketails are surely the fiercest in the Pacific Northwest). If you're concerned, just watch what you are doing, and grab them by the wings. Their wings are quite strong, without the shedding scales of butterflies.

ENVELOPE IT (2)

Place it, wings folded back, in a glassine (stamp or coin) envelope (or wax paper envelope, see template) labelled with locality and date. For each specimen you collect please fill out a specimen collection card and keep it with each specimen **separately**.

ACETONE IT (3)

After leaving your specimens in their envelopes for a while (for example, until you return home at night) so they can void their intestinal contents, kill them by immersing them briefly in acetone (available at automotive suppliers or as acetone nail polish remover). Straighten the abdomen of each specimen, arranging the legs so they don't obscure the genitalia on the second abdominal segment of males. Put them back in their labelled envelopes and leave them submerged in acetone in a tightly closed plastic container (e.g., Rubbermaid, peanut butter container, note: Acetone dissolves some plastics) for 16-24 hours. You should cut off a bit of each lower corner of the envelope so the acetone enters readily and drains when you lift the envelope out.

Acetone extracts fat and water from specimens, and they dry much better and with better color preservation than when merely air-dried. Avoid breathing of acetone fumes; a little must not be too harmful, as dragonfly collectors don't seem much weirder than other people.

Specimens with extensive pruinosity (powdery colour) may become discolored in acetone. In particular, spreadwing damselflies (Lestidae) and a few pruinose skimmers such as the Common Whitetail, *Plathemis lydia*, change color rather drastically, and you may prefer not to place them in acetone. On the other hand, I have had some individual dragonflies retain their pruinosity after acetone treatment, perhaps when the acetone is freshest. It eventually contains quite a bit of grease, and as it becomes yellowish you should replace it for best preservation.

REMOVE IT (4)

Remove your specimens from the acetone, letting all the liquid drain out, and leave them in the open for a few days so the acetone will evaporate. Preferably have a well-ventilated spot away from people as it evaporates. Try to separate the envelopes for quickest evaporation. All dried dragonfly specimens are stiff and brittle, although those that have been acetoned are stronger and more resistant to breakage.

AN ALTERNATIVE TO ACETONE

If you are unwilling or unable to use acetone (sometimes the case when traveling), an alternative is: (3-4) Let the dragonfly die in the envelope; by excreting feces from its abdomen, the abdomen dries better. Make sure the abdomen is straightened out rather than curved. Put it in a dry place to dry thoroughly; it's stiff and brittle when dry, so take care. Putting them under (or above) a heat lamp is a good way to dry specimens, but attempts at using an oven often result in discolored specimens. After drying, then go to 5 & 6.]

LABEL IT, see collection card (5)

All specimens should have the following information associated with them: location (in some detail, including mileage from known location, lake/pond or river/stream name, elevation and latitude/longitude), date, collector, determination-who did the identification, id#, and species name (if you know it; can be changed if reidentified). Give each of your specimens an id number. The specimen number is **S-** followed by the initials of your **first** and **last** name, then **-2008**, and **-001** for your first specimen, 002 for your second, and so on, i.e. the ninth specimen collected by Jim Doe would be **S-JD-2008-009**.

Many collectors include habitat notes, at the very least something like "pond" or "slow, sandy stream" or "flying over clearing." It is also of interest to associate habitat and time of day. In fact, the more information that can be associated with each specimen, the better.

STORE IT (6)-for those maintaining their own collection

Store your specimens in a box protected from both humidity and possible pests such as carpet beetles or mice. For more useful and elegant storage, after they are dry switch them to "Odonata specimen envelopes" (available from several sources, see the Odonata Information Network

Store) with the collecting information written, typed, or printed on a 3x5 card; the specimen can then be examined without taking it out of the envelope.

You can devise your own storage system for your specimens. I use custom-made boxes that would hold 3x5 cards, kept in museum specimen cases, but others keep them in boxes of appropriate sizes with a few mothballs in each box, stored on a shelf or in a cabinet or drawer. If you think your home is pestfree, you can take your chances without mothballs, but you should check for bug damage frequently to confirm this.

For pinned specimens of dragonflies, the wings were always spread, which is logical. But there are several reasons why people don't spread them in enveloped specimens:

- 1) If the wings are spread, the thorax + legs are perpendicular to the envelope, which bulges the envelope out more than it would if the specimen were sideways (a problem of storage space) and almost always leads to legs being broken off. This would be even worse with damselflies.
- 2) The terminal appendages of many species are illustrated from the side, and that view often provides identification (although so does a dorsal or ventral view, but these may be less often illustrated).
- 3) Some species would be too large for a 3x5 envelope!

Ideally, at least a few specimens should be stored with wings out, for photography, drawing, and dorsal or ventral views of the specimens without having to remove them from the envelope. Also, at least a few specimens of odonates with patterned wings should be stored with wings outspread. This is of special importance in some species, mostly damselflies, that have the upper wing surface differently colored than the lower, in some cases spectacularly iridescent.

The head usually ends up bent at 90 degrees with regard to the thorax, so you should try to store some specimens showing the top of the head, others the bottom. Also store about half facing left, half facing right, again to reduce the amount of space they take up in the box.

To examine the venation of just one side, all you have to do is remove the specimen from the envelope and carefully (from front to back) slide a piece of white paper or card between the left and right wing pairs.

COLLECTING EQUIPMENT

BioQuip is the best source of entomological supplies. Their phone is (310) 324-0620, e-mail <bioquip@aol.com>, and they will send you a catalog containing more items than you could possibly have imagined. Wards scientific supplies is another source. Locally the Newfoundland Insectarium is the prime place to purchase equipment, they carry nets, pinning boards, pins, cases, killing agent. For instructions of how to make your own net, visit <http://www.inhs.uiuc.edu/cwe/wwwtest/collect/HTML/d6.html>

Larva

Larvae are bit more difficult to preserve. Preservation of insects in alcohol is a complex subject and like many things, it varies somewhat from one group to another. In general, ethanol or isopropanol mixed with water is the most widely used preservation fluids. Most commonly, a mixture of 75% alcohol to 25% water is used. The water should be distilled to ensure a neutral PH and the solution should be thoroughly mixed since alcohols and water do not mix easily by themselves. Additives should be avoided.

Special care should be taken with labels placed in alcohol. Paper should be high quality rag or linen and acid-free. The ink should contain vegetable gum (such as India inks) as these seem to withstand the constant exposure to the alcohol the best. Pencil is fine for a temporary label.

Shell vials plugged by cotton or with polyethylene stoppers are recommended. Avoid stoppers made from cork, rubber, or neoprene as they tend to degrade and/or leach chemicals into the

alcohol. Shell vials are preferred over necked vials as it is easier to remove the specimen and the chance of damage is reduced. Each vial should be individually labelled with complete collection data.

We are not encouraging the collection of larva for volunteers because of the difficulty and expense associated with the collection and preservation of this stage of odonate development. But any professional biologists that would like to submit records we would be more than happy to look at your specimens or records.

Sending specimens

Package carefully in a sturdy box or in an appropriate sized photo mailer.

<p>Please send packaged and protected specimens to:</p> <p style="text-align: center;">Newfoundland and Labrador Butterfly Survey Wildlife Division, Department of Environment and Conservation Box 2007 Corner Brook, Newfoundland A2H 7S1 Attn: Bruce Rodrigues (Label as) Fragile</p> <p>Please send the completed forms to:</p> <p style="text-align: center;">Via mail: same address as above. --or-- Fax: 709 637 2080 / Attn: Bruce Rodrigues --or-- Email: BruceRodrigues@gov.nl.ca</p>
