Migratory Dragonfly Data Collection Protocol for Hawkwatchers

Thank you for helping us collect data for the Migratory Dragonfly Partnership (MDP), a pioneering citizen science-based study of dragonfly migration in North America! Additional information about dragonfly migration and resources for dragonfly identification are available on the MDP website (www.migratorydragonflypartnership.org).

Migrating dragonflies are often seen along routes used by migrating birds. Dragonfly migration can be extremely sporadic, and hawkwatchers are ideally situated to observe dragonfly migration and provide valuable and much-needed data. A hawkwatch may designate a special counter just for dragonflies or use current hawkwatchers to collect the data. Either can work!

Only count dragonflies that appear to be migrating, i.e. moving in a directed fashion. If dragonflies are present at your site in large numbers as a feeding swarm or perching and flying in the area, note those observations and estimated numbers at bottom of form under "Other Comments". Such dragonflies may be local residents, or they may be migrants that have paused to rest and re-fuel. If unable to count but want to provide estimate of migration numbers, note that in Other Comments as well.

Dragonfly Data Form and Methods

Weather data and general conditions of the day will be taken from hawkwatch data entered into hawkcount.org, so there is no need to duplicate collection of those data here. The data sheet is set up to allow counting for a few minutes every hour or when possible, or for full hours of counts. Do what you can and make note of numbers for whatever period you count. We recognize the ability to scan for dragonflies will vary with the hawk flight.

Header Information:
Date: Enter observation date as Day/Month/Year.
Site Name/State Prov.: Enter the site name and the state or province it is in (e.g. Fort Smallwood, MD)
Start Time: Enter time you begin your hawkwatching at the site.
End Time: Enter time you end your hawkwatching at the site.
Observers: Enter last name and first initials of observers contributing dragonfly data.

Dragonfly Hourly Counts

Count start time / count end time: For observers counting the entire hour, the start and end times would be at the start and end of the hour (i.e. 10:00 – 11:00). For observers conducting a shorter count, the applicable start and end times should be entered, i.e. a shorter intensive timed counts (i.e. ,10:35 – 10:45). We recommend a 5 or 10 minute timed count during which an observer will actively scan for

dragonflies each hour. This can be done by an assistant as well. If hawk flights or busy it is okay to skip data collection for certain hours.

 # Minutes Counted: Record the actual number of minutes an observer actually scanned and counted dragonflies, ranging from 0 to 60. ***Record this value in Hawkcount.org.***

 # Dragonflies Counted: Record the actual number of dragonflies you counted during your timed count. If impossible to count, make an estimate and note in other comments that number was estimated. ***Record this value in Hawkcount.org.***

Flight Altitude: Estimate elevation of the dragonfly flight above ground level of your location (in feet). ***Record this value in Hawkcount.org.***

Flight Direction: Enter the cardinal direction in which dragonflies are moving (S, E, S by SW, etc.) ***Record this value in Hawkcount.org.***

Species seen in flight: If you can identify the dragonflies to species, or at least the five that the Partnership wishes to track (see web link below). Use the codes shown on bottom of the datasheet for species you were able to identify as passing by. The MDP is focusing on the five species known to be the most regular migrants in North America:
Anax junius (Common Green Darner, AJ);
 Pantala flavescens (Wandering Glider, PF);
Pantala hymenaea (Spot-winged Glider, PH);
Tramea lacerata (Black Saddlebags, TL);
and *Sympetrum corruptum* (Variegated Meadowhawk, SC).
 If none of the species seen at your site can be identified, that is okay, just enter UN (unknown). If only some are identifiable, then enter estimate percentage UN and list species noted.

 A field guide developed specifically for identifying migrating dragonflies can be found on the MDP web site at http://www.migratorydragonflypartnership.org/uploads/_ROOT/File/MDP-field_guide.pdf

Coincident Taxa: If you see any other species, list any additional species of dragonflies you observe in the migration flight.

Behavioral observations: Record any additional details about the dragonfly flight or special notes. You can also provide descriptions of unknown dragonflies to give clues about their identity, such as size, shape, color, or wing markings (i.e. "very long thin body", "broad hindwings", "large green and brown dragonflies", etc.)

Other Comments: Enter any comments on the flight at the bottom of the page including whether there were pulses or steady flight during day. If flight is too heavy to count, it is helpful to provide an estimate of flight numbers here as well, e.g. > 1000, < 500, etc.

At end of the day, total your minutes counted and number of individuals counted. If you enter hawk data daily into Hawkcount.org you will enter this total into your dragonfly data fields. For flight altitude and direction, daily entry should represent the predominant altitude and direction for the day.

Entering your Dragonfly counts into Hawkcount.org: We encourage you to enter dragonfly numbers in Hawkcount.org! You can easily set up your data entry page in hawkcount.org to have three extra fields whether you are entering hourly or daily format on Hawkcount.org. These fields will be for hourly or daily dragonfly numbers, minutes counted, and notes on flight direction, altitude, species present. In order to set up these fields in Hawkcount.org, contact HMANA Site Coordinator Julie Brown (brown@hmana.org) and let her know you wish to collect dragonfly data, and if you are entering your hawk data hourly or daily. She will work with our database manager to have fields ready for entry. **Please contact Julie prior to August 15th** to have it ready for the fall season or as soon as you can thereafter.   The fields will represent the # minutes observed per hour or day, the # of dragonflies observed during the hour or day count, and a text field called "Flight Attributes" where you should enter flight direction, flight altitude, and the codes for any species you can identify. Those fields will appear in the area where you enter observer and weather data.

Thank you for your help! Send any questions regarding data collection protocols to goodrich@hawkmtn.org, celeste@xerces.org, or brown@hmana.org. At end of season, mail, scan and email, or fax final data forms to the migration monitoring organizer so they can gather any additional information about the migration.

At end of season Please send hard copy forms or email pdf copies to below address.
 Send forms to Dragonfly Migration Monitoring, Xerces Society, 628 NE Broadway, Suite 200, Portland, OR 97232, USA.

DRAGONFLY CODES

Anax junius **(Common Green Darner) = AJ**
Tramea lacerata **(Black Saddlebags) = TL**
Sympetrum corruptum **(Variegated Meadowhawk) = SC**
Pantala hymenaea **(Spot-winged Glider) = PH**
Pantala flavescens (Wandering Glider) = PF
Unknown = UN