

Odonate Phenotypic DataBase

www.odonatephenotypicdatabase.org

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Taxonomy

GenusSpecies, Genus, Species, Family, SubOrder

Taxonomy of record. Names are taken from the World Odonata List.

<https://www.pugetsound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/world-odonata-list2/>

The names used in the database were downloaded from the list in 2015. In the future we hope include synonyms in the database, so as to track taxonomic changes.

Sex

The database currently has more phenotypic descriptions for males than for females. This reflects the current distribution in the literature, and the fact that females are typically more difficult to identify in the field.

Size

body_lengths or female_body_lengths

Total length (mm). Mean or mid-point values are used when a range is given in the source material.

forewing_lengths or female_forewing_lengths

Length of the front wing (mm). Mean or mid-point values are used when a range is given in the source material.

hindwing_lengths or female_hindwing_lengths

Length of the hind wing (mm). Mean or mid-point values are used when a range is given in the source material. Hind wing lengths are reported in the literature much more often than front wing lengths.

Body Colors

body_colors

Body colors (head, thorax, abdomen, legs). The human visual perception of a body color in an image or illustration. The database uses the following colors: **black, blue, brown, green, orange, red, yellow**. When mixed, multiple colors are reported. In the future, we hope to incorporate machine-read colors (i.e. rgb-values) into the database.

body_colortypes

Body color type (head, thorax, abdomen, legs) or how the color is produced physically. The database uses the following classifications: **pigment** (has matte appearance), **structural** (has metallic appearance), or **pruinescence** (has powder appearance). When a species has multiple color types, all are listed. Mixed can be any body part (head, thorax, abdomen, legs). For example, structural legs and pigmented body would be “**pigment structural**.” More fine-grained classifications might be possible in the future.

body_patterns

Body patterns (head, thorax, abdomen, legs). The patterns found on any part of the body. The database uses the following classifications: **plain** (no pattern, matte color), **striped** (have some strip-like pattern), **spotted** (has dot or spot-like pattern). When more than one pattern type is present both are listed, such as “**spotted, striped**.”

Behaviour

mate_guarding

The type of mate guarding behavior listed in the literature. The database has the following classifications: **contact** (male holds female after mating), **noncontact** (male guards female but does not hold after mating), **none** (male does not guard female).

flight_mode

Primary type of flight behaviour in listed in the literature. The database currently uses two classifications: **flier** (more often flying) or **percher** (more often perching). If mixed behaviour, both are listed.

territoriality

The territoriality of the male as listed in the literature. The databases uses two classifications: **nonterritorial** and **territorial**.

Location and Habitat

continents

What continents are populations known to exist. The database uses the following continents: **afrika, asia, australia, europe, north america**, and **south america**. When on several continents multiple are listed.

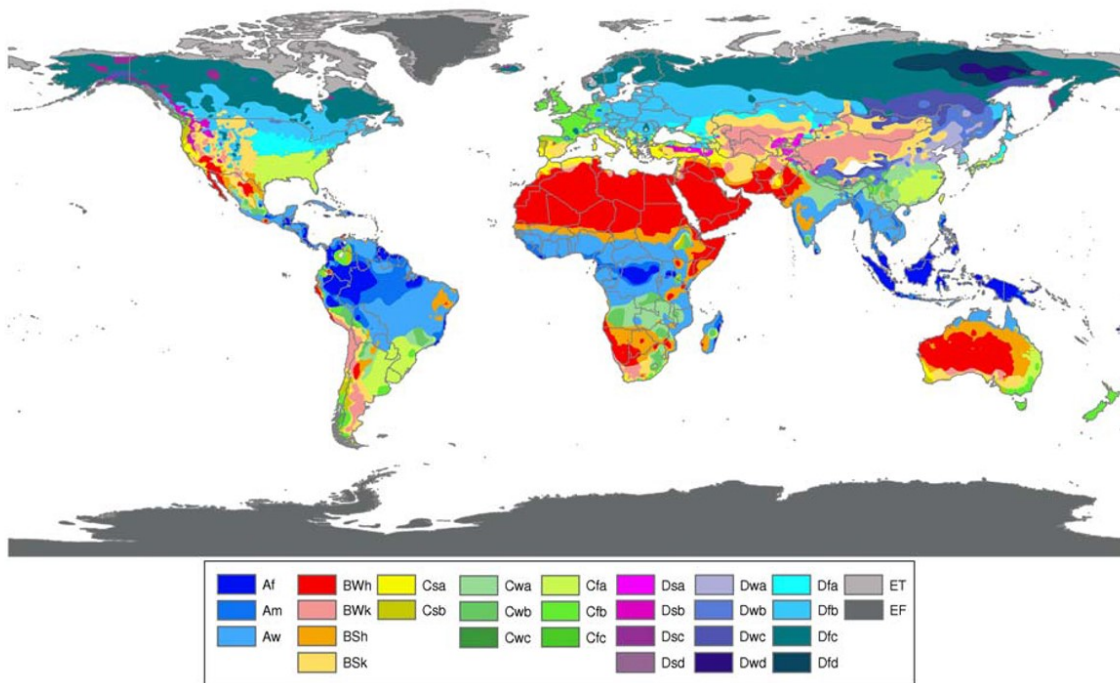
aquatic_habitats

The type of aquatic habitat that the adults primarily exist in and around. The database uses the following classifications: **ephemeral** (a small pool that dries up quickly), **lake**, **pond**, **river**, **stream**, **wetland**.

climates

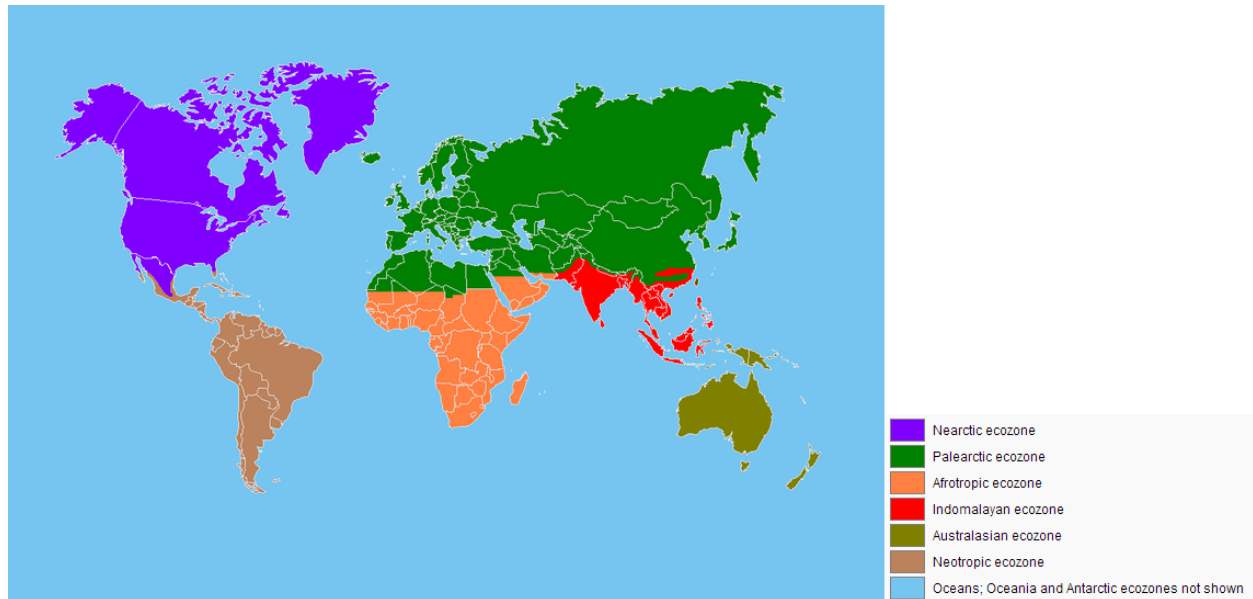
Climates where they populations are known to be found according to distributions maps.

See: Climate classification: Discrete climate classifications, using the 30 categories in Köppen-Geiger classification scheme (Peel et al. 2007 Hydrol. Earth Syst. Sci 11: 1633–1644).



ecozones

Which “ecozone” are populations known to exist from looking at distribution maps. The database uses the following: **afrotropical**, **antarctica**, **australasia**, **indomalaya**, **nearctic**, **neotropical**, **oceania**, and **palearctic**. Eight different ecozones exist, and their locations and borders are shown on the World map below.



habitat_openness

Habitat openness: **closed**, **open**, **semi**. When mixed more than one can be recorded.

Morphisms

sex_polymorphisms

Is the species polymorphic? The following categories are used in the database: **females** (females are polymorphic), **males** (males are polymorphic), and **monomorphic** (both sexes known to be monomorphic). If both males and females are polymorphic, both are listed “**males females**.”

sex_dimorphisms

Is the species sexually dimorphic? The database uses the following classifications: **medium**, **strong**, or **weak**. Since all species are likely to be at least slightly dimorphic, “**weak**” dimorphism implies very few differences, while “**strong**” dimorphisms implies that the sexes are easily distinguished in the field.

geo_polymorphisms

Is the species polymorphic geographically? In other words, are there different types of morphs in different regions. The following categories are used in the database: **females polymorphic**, **males polymorphic**, and **monomorphic**. For example, if males of one species has black spots in north Africa but orange spots in southern Africa, that would be recorded as “**males polymorphic**”. If both sexes are known to be the same across their range, that species is recorded as “**monomorphic**.”

Wing Pigment or Color

has_wing_pigment

Does the species have wing color? **yes** or **no**. If the species has clear wings, the database records “**no**”. If the wings have color, “**yes**” is recorded.

wing_pigment_extent_discrete

Discrete levels of coloration that cover the wing. It is recorded in the database as : **10%, 25% ,50% ,75%** ,or **100%**.

wing_pigment_extent_continuous

Continuous measure of wing coloration. Proportion of the wing that is colored (0-1) colored area of the wing divided by total area of the wing.

wing_pigment_pattern

The pattern of wing color on the wings. In the database, we record three types: **stripes, patch, or dots**. If more than one type, multiple are listed.

wing_pigment_symmetry

Do front and hind wings have color to an equal extent? If yes we record **symmetric pigment**, if no then: we put either **hindwing more pigment** or **forewing more pigment**.

wing_pigment_dimorphism

Wing sexual dimorphism. The differences in wing pigment between the sexes. The scale that takes differences in coloration into account: male and female have roughly the same amount of colouration on the wings +/- 10 % and have the same colors present, can be classified as **not dimorphic**. If males and females differ in coloration by more than 10 percent, and/or differ in the colors present on the wing, classified as **weakly dimorphic** in their wing coloration. If males and females differ by more than 50% and may have different colors present, they are classified as **strongly dimorphic**. If males and females have both fully pigmented wings, but differ in colors present (for example, male dark brown, female amber), **weakly dimorphic** is recorded.

wing_pigment_color

The colors present in the wing. The database records the following colors: **brown, red, yellow, black, orange, iridescent, amber** (amber covers light brown to orange), **prunescence**, and **blue**. If multiple colors are present in the wing, multiple colors are listed.

wing_pigment_placement

Where the pigment or color is located. If the wing color or pigment is found at the bottom of the wing, **basal** is recorded. If the pigment is found in the center of the wing, **middle** is recorded. If the pigment is found at the tip of the wing, **tip** is recorded. If the wing is fully covered in color or pigment, **full** is

recorded. If multiple areas are covered by color or pigment, multiple areas are listed, such as “**tip middle**”.

wing_pigment_color_type

Wing color type present. If color is matte in appearance, than **pigment** recorded. If color has metallic or is known to be generated by structures, **structural** is recorded. If both pigment and structural colors are present, then both **pigment** and **structural** are recorded. Since the basis for structural coloration is often pigment, pigment and structural often appear together for the same species.

female_has_wing_pigment

Does the species have wing color? **Yes** or **no**. If the species has clear wings, the database records “no”. If the wings have color, yes is recorded. If the wings are slightly transparent and not completely opaque, **smokey** is recorded.

female_wing_pigment_extent_discrete

Discrete levels of coloration that cover the wing. It is recorded in the database as : **10%, 25% ,50% ,75%** ,or **100%**.

female_wing_pigment_extent_continuous

Continuous measure of wing coloration. Proportion of the wing that is colored (0-1) colored area of the wing divided by total area of the wing.

female_wing_pigment_placement

Where the pigment or color is located. If the wing color or pigment is found at the bottom of the wing, **basal** is recorded. If the pigment is found in the center of the wing, **middle** is recorded. If the pigment is found at the tip of the wing, **tip** is recorded. If the wing is fully covered in color or pigment, **full** is recorded. If multiple areas are covered by color or pigment, multiple areas are listed, such as “**tip middle**”.

citations

The primary references used to gather the data. Most of time these are field guides. Below is a list of resources that the database currently is based on.

Authors	Title and Publisher	Year
Theischinger and Hawking	Complete Field Guide to Dragonflies of Australia; CSIRO Publishing	2006
Kawashima and Futahashi	Dragonflies of Japan; Bunichi-Sogo Syuppan	2012
Dijkstra and Lewington	Field Guide to the Dragonflies of Britain and Europe; British Wildlife Publishing	2006

Paulson	Dragonflies and Damselflies of the West; Princeton University Press	2009
Samways	Dragonflies and Damselflies of South Africa; Penguin Random House South Africa	2008
Tarboton and Tarboton	A Fieldguide to the Dragonflies of South Africa; Warwick & Michèle Tarboton	2002
Heckman	Encyclopedia of South American Aquatic Insects: Odonata-Anisoptera; Springer	2006
Paulson	Dragonflies and Damselflies of the East; Princeton University Press	2011
Tang Hung Bun et al	A Photographic Guide to the Dragonflies of Singapore; Raffles Museum of Biodiversity Research	2010
Subramanian	Dragonflies and Damselflies of Peninsular India: A Field Guide; Indian academy of Sciences	2005
Hamalainen and Pinratana	Atlas of the Dragonflies of Thailand Distribution Maps by Provinces; Brothers of St. Gabriel in Thailand	1999
Esquivel	Dragonflies and damselflies of Middle America and the Caribbean; INBio	2006
Garrison et al	Dragonfly Genera of the New World An Illustrated and Annotated Key to the Anisoptera; John Hopkins University Press	2010
Nair	Dragonflies and Damselflies of Orissa and Eastern; Orissa Wildlife Organisation	2011
Tarboton and Tarboton	A Fieldguide to the Dragonflies of South Africa; Tarboton and Tarboton	2005
Okudaira et al	Dragonflies of the Japanese Archipelago in Color; Hokkaido UP	2001
Lencioni	Damselflies of Brazil: An illustrated identification guide 2 Coenagrionidae; F.A.A Lencioni	2006
Suhling and Martens	Dragonflies and Damselflies of Namibia; Gamsberg Macmillan	2007
Askew	The Dragonflies of Europe; Great Horkesley	1988
Dunkle	Dragonflies through Binoculars: A Field Guide to Dragonflies of North America (Butterflies Through Binoculars); Oxford University Press	2000
Manolis	Dragonflies and Damselflies of California; University of California Press	2003
Abbott	Dragonflies and Damselflies (Odonata) of Texas Volume 5; John C. Abbot	2011
Dijkstra and Clausnitzer	The Dragonflies and Damselflies of Eastern Africa; RMCA	2014
Tze-wai et al	The Dragonflies of Hong Kong; Cosmos	2011
Michalski	The Dragonflies and Damselflies of Trinidad and Tobago; Kanduanum Books	2015
Kompier	A Guide to the Dragonflies and Damselflies of the Serra dos Orgaos South-eastern Brazil; Regua publications	2015
Marinov and Waqa-Sakiti	An Illustrated Guide to Dragonflies of Viti Levu Fiji; The University of the South Pacific Institute of Applied Sciences	2013
Polhemus and Asquith	Hawaiian Damselflies: A Field Identification Guide; Bishop Museum	1996

