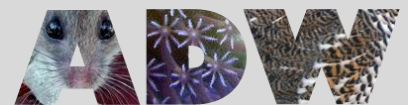


Asking and Answering Questions: ADW's Flexible Querying Tool

Tanya Dewey, Phil Myers, Roger Espinosa,
Tricia Jones, George Hammond

animaldiversity.org

tanyadewey@animaldiversity.org





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Browse Animalia



Annelida
segmented worms

Echinodermata
starfish, sea urchins,
and relatives

Mollusca
bivalves, cephalopods,
snails, and relatives

Chondrichthyes
rays, sharks, and
relatives

Actinopterygii
ray-finned fishes

Amphibia
frogs, salamanders,
and caecilians

Insecta
insects

Crustacea
crustaceans

Chelicerata
chelicerates

Cnidaria
jellyfish, sea



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ADW Mission

The Animal Diversity Web is an online database and encyclopedia of animal natural history, built through contributions from students, photographers, and many others.

It is a rich and flexible resource designed both as an encyclopedia for exploring biodiversity and for use in formal, inquiry-based education.

animaldiversity.org





Understanding
Science
how science *really* works

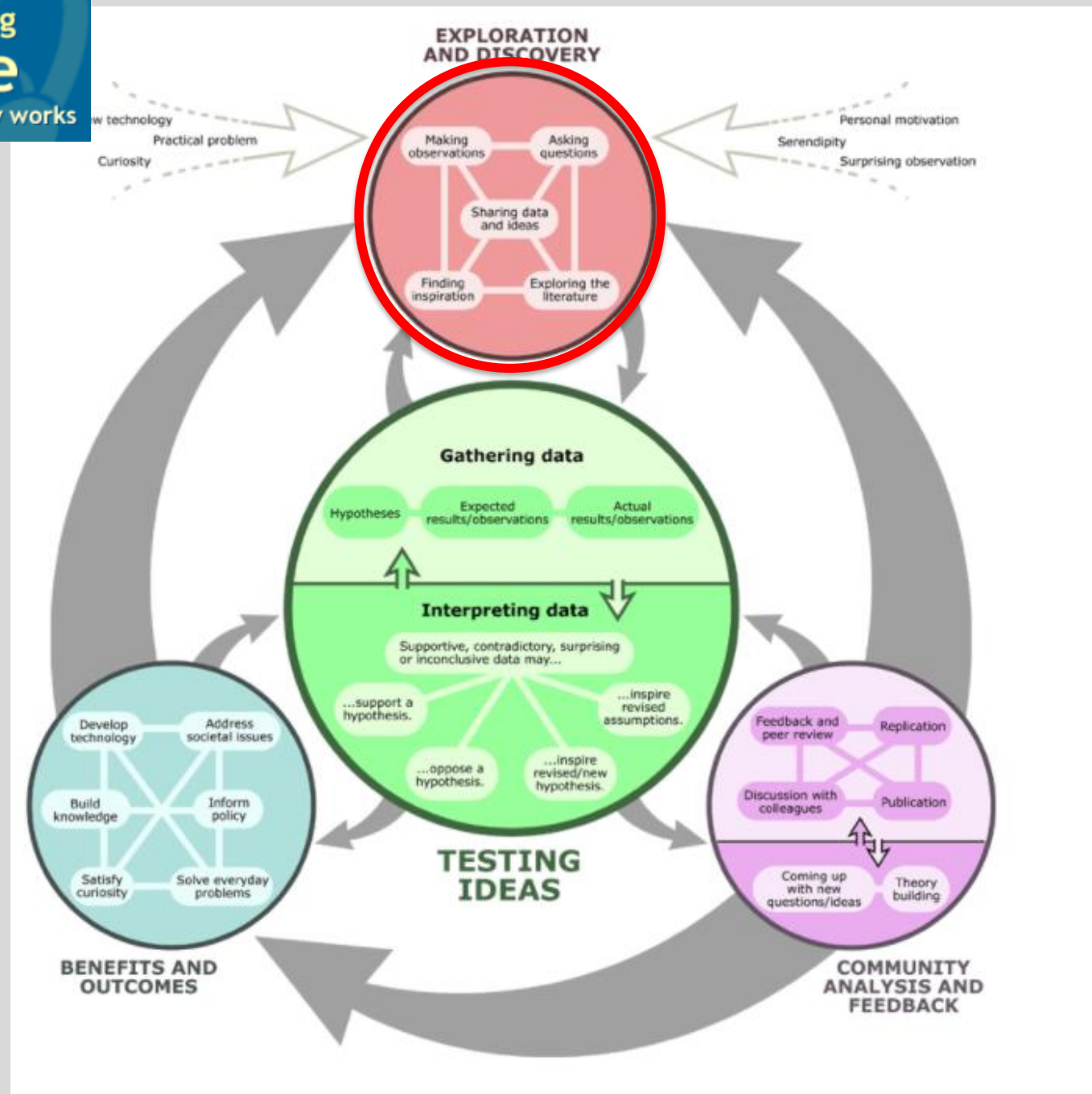
Explore!

Dive in

Ask questions

Answer
questions

Large and
small





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Browse Animalia



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segmented worms

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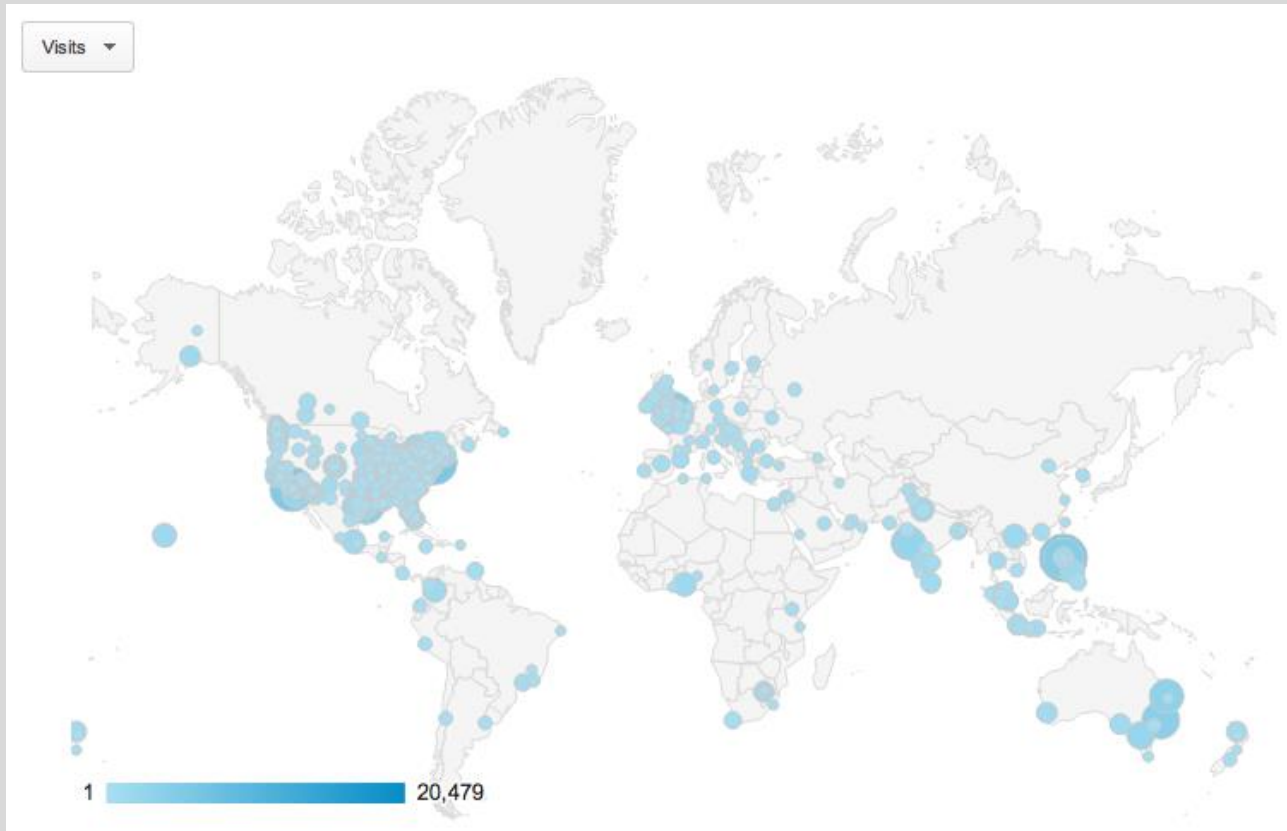
The Animal Diversity Web is:

- a global natural history database
- built by students
- using museum data
- that supports student inquiry



- a global natural history database

1.4 million pages monthly to over 400,000 unique visitors

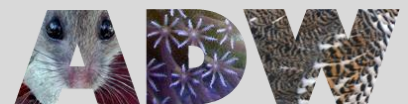


- built by students

77 institutions, hundreds of courses, over 3500 student authors

> 4000 species, 400 higher taxa, 19,000 live animal images

Missouri State University - BIO 676 - 2016				
 <i>Siren intermedia</i> revision	Amphibia	rav13 Sickler, Stephanie sickler13@live.missouristate.edu	2016-12-21 11:52	submitted
Stony Brook University - WSE 187 - 2015				
 <i>Ectophylla alba</i>	Mammalia	lolofohe Yohe, Laurel laurel.yohe@stonybrook.edu	2015-09-02 12:00	in-progress
University of Wisconsin - Stevens Point - Biol 490 - 2016				
 <i>Ambystoma annulatum</i> revision	Amphibia	lport401 Porter, Laura lport401@uwsp.edu	2016-05-18 12:37	pending
 <i>Tyrannus savana</i>	Aves	tschi627 Schirmer, Taylor tschi627@uwsp.edu	2016-05-10 17:52	submitted
 <i>Zosterops japonicus</i>	Aves	azuel960 Zuelke, Amber azuel960@uwsp.edu	2016-05-05 17:53	submitted
 <i>Coquillettia perturbans</i>	Insecta	kbead121 Beadle, Katherine kjbeadle26@gmail.com	2016-05-18 14:39	pending
 <i>Schistosoma mekongi</i>	Trematoda	zlind030 Lind, Zachary zlind030@uwsp.edu	2016-05-04 17:13	submitted



- using museum data
7,500 specimen images

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Chiroptera
bats

Facebook Twitter

Filter results by...

Page 1 of 133

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on the iOS App Store!

The Animal Diversity Web team is excited to announce ADW Pocket Guides!

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golden-capped fruit bat
Acerodon jubatus

golden-capped fruit bat
Acerodon jubatus

golden-capped fruit bat
Acerodon jubatus

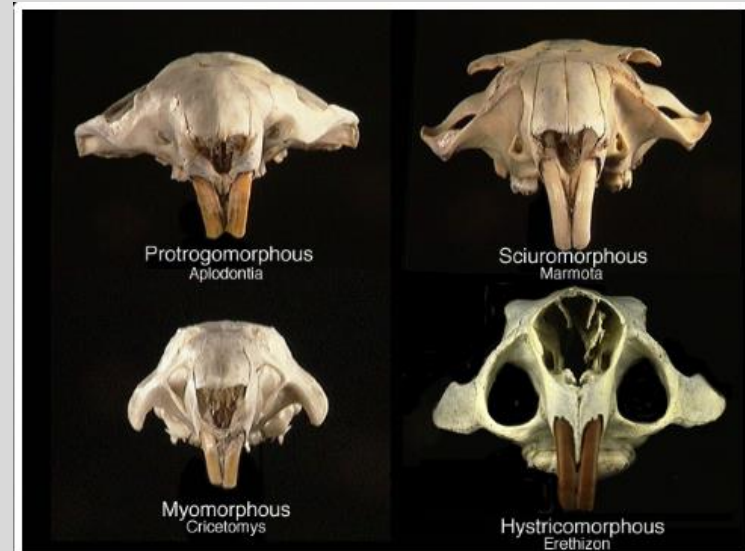
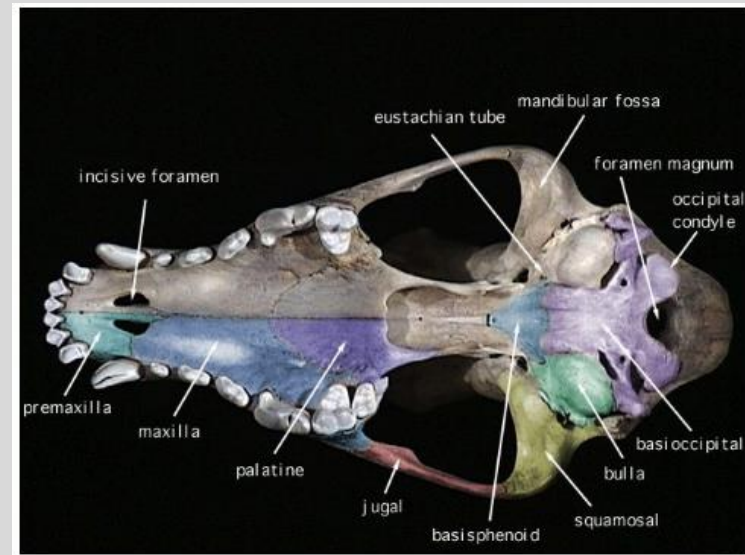
golden-capped fruit bat
Acerodon jubatus

golden-capped fruit bat
Acerodon jubatus

golden-capped fruit bat
Acerodon jubatus

golden-capped fruit bat
Acerodon jubatus

golden-capped fruit bat
Acerodon jubatus




- that supports student inquiry

Over 30 institutions, thousands of students, and more than 30 prepared activities

Dr. Phil Myers






Animal Diversity Web

QUAARDVARK

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Animal Diversity Web

Welcome to QUAARDVARK



Welcome to **Quaardvark**, a tool for creating complex queries that allow you to dig through the underlying database of the [Animal Diversity Web](#) to discover ecological and evolutionary patterns in the natural world.

Quick Overview

- **Query and Report** takes you to the query tool, where you can search Animal Diversity Web data and create spreadsheet-like reports. You will need to be **registered** to download data or save work.
- For an explanation (including short screencasts) of how to set up queries and reports, see "[Using Quaardvark](#)".
- Here is the PDF version of a poster we recently shared at an NSF Primary Investigators meeting: [PI Meeting Poster](#)

Educators and Researchers

- To see how other educators have used Quaardvark, take a look at the set of [Sample Activities](#).
- To explore the query tool without registering, select **Query and Report**. You will not be able to download data or save queries with this option, but you can access all search features and view reports within your browser.



What goes into supporting flexible querying?

- taxonomic skeleton
- a fully structured database
- controlled vocabulary keywords
- data fields



- taxonomic skeleton

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BioKIDS Critter Catalog

Encyclopedia of Life

Piranga ludoviciana

western tanager



By Jeneil Boles

Geographic Range

Habitat

Physical Description

Reproduction

Lifespan/Longevity

Behavior

Communication and Perception

Food Habits

Predation

Ecosystem Roles

Economic Importance for Humans: Positive

Economic Importance for Humans: Negative

Conservation Status

Other Comments

Contributors

References

Geographic Range

The geographic region of western tanagers (*Piranga ludoviciana*) follows the forest, ranging from the western coasts of North America and Central America from Alaska all the way to Panama. This region stretches as far east as the Northwest Territories in Canada and the western edge of North Dakota, Nebraska, and Texas. Their main residency and breeding territory is in the far northern region of Canada and they migrate south during the winter. However, they have been known to breed in their wintering regions of South America. (Meyer, 2006; Monroy-Ojeda, et al., 2013)

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Sounds

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Classification

Kingdom

Animalia

animals

Phylum

Chordata

chordates

Subphylum

Vertebrata

vertebrates



- a fully structured database

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Piranga ludoviciana

western tanager



By Jeneil Boles

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Classification

Kingdom

Animalia

animals

Phylum

Chordata

chordates

Subphylum

Vertebrata

vertebrates

- controlled vocabulary keywords

Some key physical features

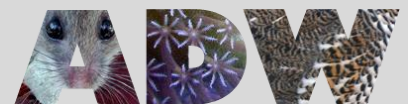
- ☒ Endothermic 🔍
- ☐ Heterothermic 🔍
- ☐ Homoiothermic
- ☒ Bilateral symmetry 🔍
- ☐ Polymorphic 🔍
- ☐ Poisonous (bad news if you bite it) 🔍
- ☐ Venomous (bad news if it bites you) 🔍

Sexual dimorphism 🔍

- ☒ Sexes alike
- ☐ Female larger
- ☐ Male larger
- ☐ Sexes colored or patterned differently
- ☐ Female more colorful
- ☐ Male more colorful
- ☐ Sexes shaped differently
- ☐ Ornamentation (antlers, wattles, etc.) 🔍

Key behaviors

- ☒ arboreal (lives in trees) 🔍
- ☐ scansorial (specialized for climbing in trees)
- ☐ cursorial (specialized for running)
- ☐ terricolous (lives on the ground)
- ☐ fossorial (specialized for burrowing under ground) 🔍
- ☐ troglophilic (breeds and thrives in caves)
- ☐ flies
- ☐ glides
- ☐ saltatorial (specialized for jumping and hopping) 🔍
- ☐ natatorial (specialized for swimming) 🔍
- ☒ diurnal (active during the day) 🔍
- ☐ nocturnal (active at night) 🔍
- ☐ crepuscular (active at dusk and dawn) 🔍
- ☐ parasite 🔍
- ☒ motile (able to move around) 🔍
- ☐ nomadic (moves throughout a large range year-round) 🔍
- ☐ migratory (moves seasonally between different regions) 🔍
- ☐ sedentary (mainly stays in one general area) 🔍
- ☐ hibernation (inactive during the winter) 🔍
- ☐ aestivation (dormant during hot weather or times of little food)
- ☐ daily torpor (dormant for a part of each day)
- ☐ solitary 🔍
- ☒ territorial (area defended by an animal or group) 🔍
- ☐ social (lives mainly in a group) 🔍
- ☐ colonial (lives in large groups) 🔍
- ☐ dominance hierarchies 🔍



- data fields

Longest known lifespan in wild

Low:

High:

Average:

Units:

Longest known lifespan in captivity

Low:

High:

Average:

Units:

Expected lifespan in wild

Low:

High:

Average:

Units:

Expected lifespan in captivity

Low:

High:

Average:

Units:

Eggs per season

Low:

High:

Average:

Time to hatching

Low:

High:

Average:

Units:

Birth Mass

Low:

High:

Average:

Units:

Time to fledging

Low:

High:

Average:

Units:

Time to independence

Low:

High:

Average:

Units:

Age at sexual or reproductive maturity (female)

Low:

High:

Average:

Units:



The result:

- flexible presentation of content
- flexible queries to explore hypotheses



- flexible presentation of content

BioKIDS Critter Catalog



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Piranga ludoviciana
western tanager

By Jeneil Wobes

Geographic Range
The geographic region of western tanagers (*Piranga ludoviciana*) follows the forest, ranging from the western coasts of North America and Central America from Alaska all the way to Panama. This region stretches as far east as the Northwest Territories in Canada and the western edge of North Dakota, Nebraska, and Texas. Their main residency and breeding territory is in the far northern region of Canada and they migrate south during the winter. However, they have been known to breed in their wintering regions of South America. (Meyer, 2006; Monroy-Ojeda, et al., 2013)

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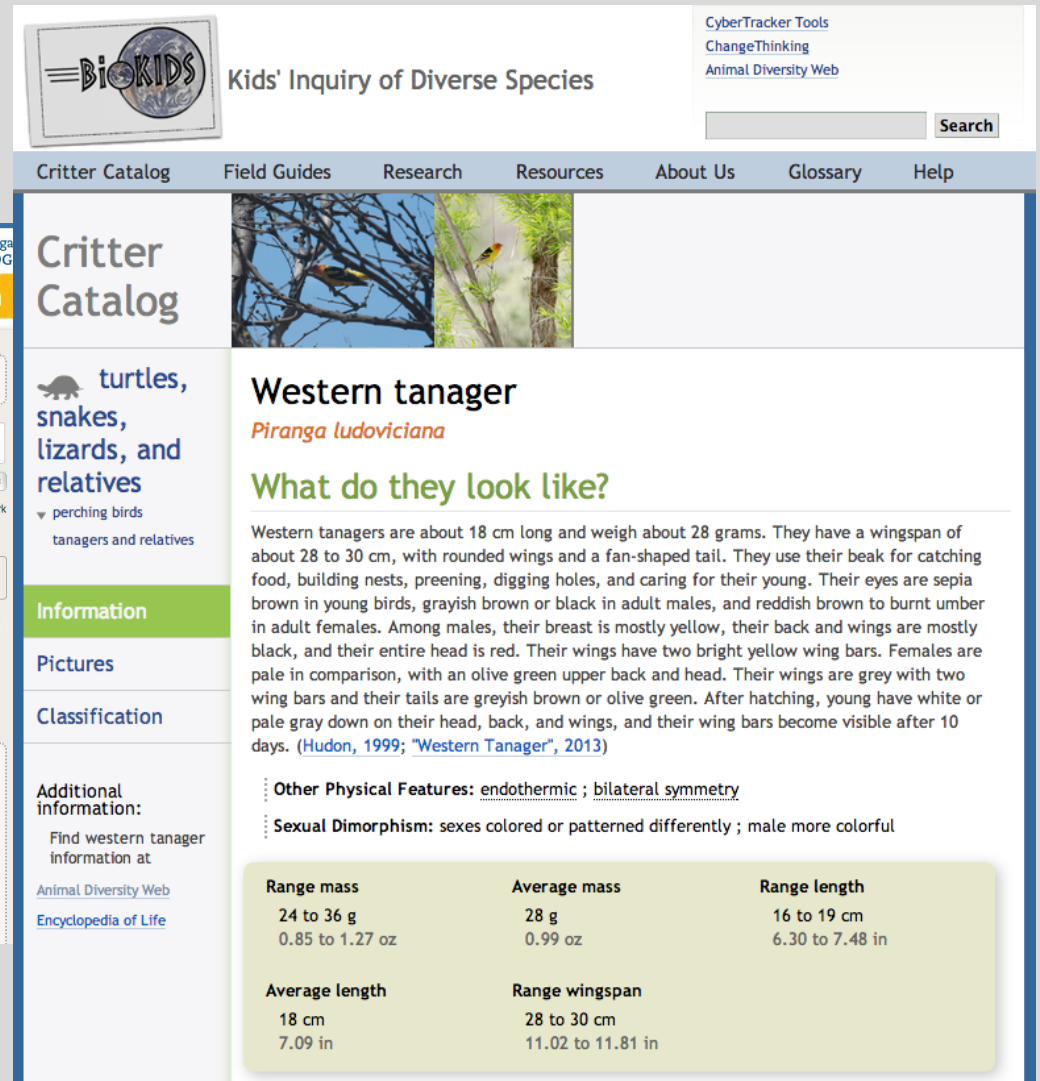
Information

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Phylum
Chordata
chordates
Subphylum
Vertebrata
vertebrates



BioKIDS Kids' Inquiry of Diverse Species

CyberTracker Tools
ChangeThinking
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Critter Catalog

turtles, snakes, lizards, and relatives

perching birds
tanagers and relatives

Western tanager
Piranga ludoviciana

What do they look like?

Western tanagers are about 18 cm long and weigh about 28 grams. They have a wingspan of about 28 to 30 cm, with rounded wings and a fan-shaped tail. They use their beak for catching food, building nests, preening, digging holes, and caring for their young. Their eyes are sepia brown in young birds, grayish brown or black in adult males, and reddish brown to burnt umber in adult females. Among males, their breast is mostly yellow, their back and wings are mostly black, and their entire head is red. Their wings have two bright yellow wing bars. Females are pale in comparison, with an olive green upper back and head. Their wings are grey with two wing bars and their tails are greyish brown or olive green. After hatching, young have white or pale gray down on their head, back, and wings, and their wing bars become visible after 10 days. (Hudon, 1999; "Western Tanager", 2013)

Other Physical Features: endothermic ; bilateral symmetry

Sexual Dimorphism: sexes colored or patterned differently ; male more colorful

Range mass	Average mass	Range length
24 to 36 g 0.85 to 1.27 oz	28 g 0.99 oz	16 to 19 cm 6.30 to 7.48 in

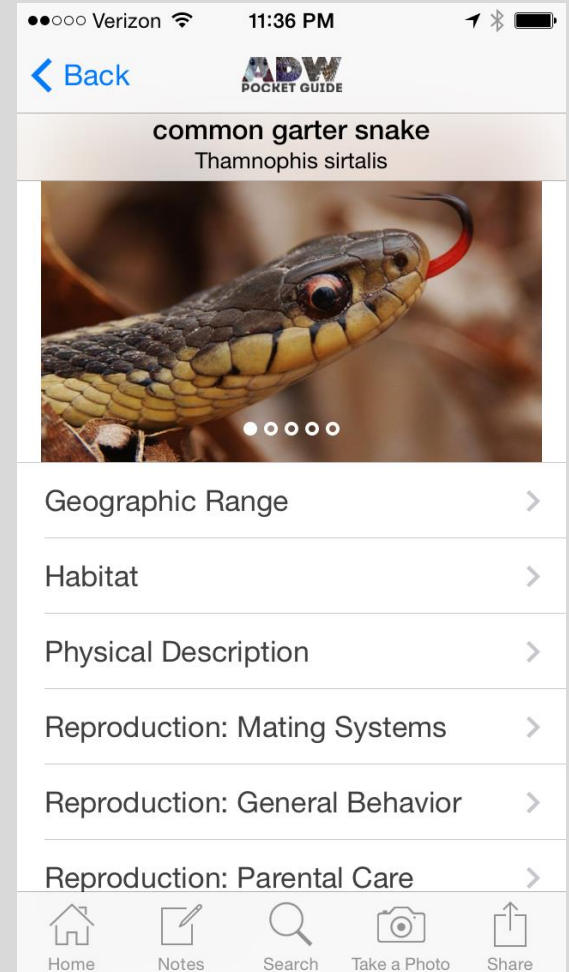
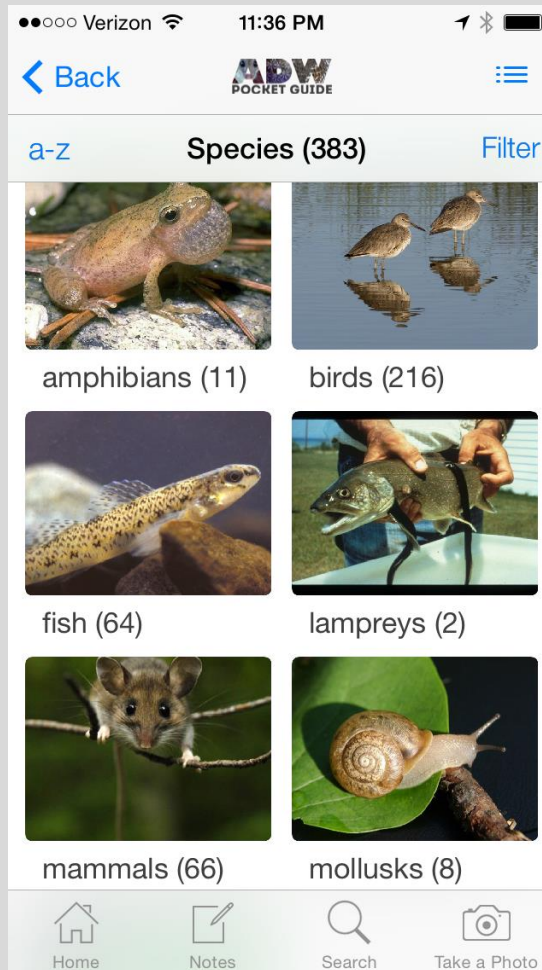
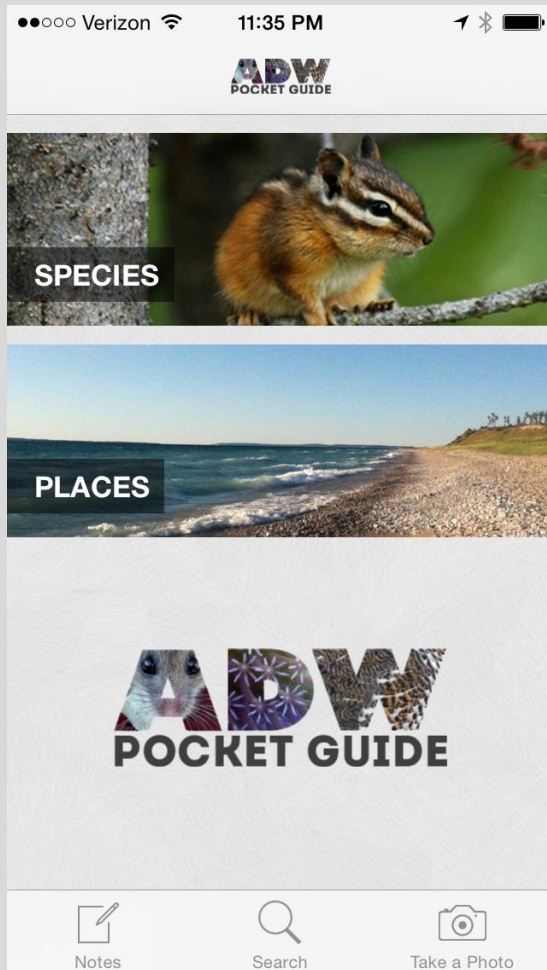
Average length	Range wingspan
18 cm 7.09 in	28 to 30 cm 11.02 to 11.81 in

Additional information:
Find western tanager information at
[Animal Diversity Web](#)
[Encyclopedia of Life](#)




- flexible presentation of content

Customized pocket guides



- flexible queries to explore hypotheses

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Query *What group of animals are you interested in searching?*

Animal Group "Animalia" [Edit](#) [Add condition](#) [Delete](#)

[Add animal group](#)

Report *What do you want to know about them?*

Taxonomic Ranks > Species

Taxonomic Ranks > Class ... [Edit](#) [Move Up](#) [Move Down](#) [Delete](#)

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Sample Activities



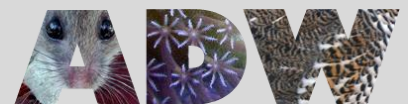
ADW project staff and collaborating faculty have created a suite of learning activities that use data from the Animal Diversity Web, extracted with Quaardvark. In each activity students construct their own searches and extract data sets that are large enough for them to find patterns. Below is a list of activities suitable for different types of undergraduate courses, followed by a full list of activities. Activity titles link to individual pages with downloadable activity documents.

Suitable for introductory biology students:


- [An Introduction to the Animal Diversity Web and Quaardvark](#)
- [Taxonomic Diversity and the Environment](#)
- [Introduction to Data Analysis](#)
- [Life History Impacts on Number of Offspring](#)
- [Form and Function](#)
- [Generalized Sexual Dimorphism And Mating System Exercise](#)
- [Mass and Lifespan in Aves](#)
- [Sociality And Habitat In Aves](#)
- [Patterns in Life Histories and Conservation Risk](#)
- [Ecotree Exercise](#)
- [Endangered Species Lab](#)
- [Terrestrial/Aquatic Comparisons](#)
- [Relating Natural History Traits to Basal Metabolic Rate](#)
- [Body Mass and Basal Metabolic Rate in Birds and Mammals](#)

Suitable for ecology, conservation, wildlife classes:

- [An Introduction to the Animal Diversity Web and Quaardvark](#)
- [Taxonomic Diversity and the Environment](#)
- [Introduction to Data Analysis](#)




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Bird Beak Structure and Diet
Apr 24, 2013 - 15:55 - **George Hammond**


Students analyze photos of birds from different primary foraging categories to test the hypothesis that morphological adaptations for different food types are consistent within a trophic category and different across trophic categories (e.g., piscivores generally have long, thin beaks, whereas terrestrial mammal predators have squarish beaks). Diet information and beak photos are drawn from the Animal Diversity Web using Quaardvark. Students can use the free image analysis program "Image J" (from the National Institutes of Health) to determine beak size and shape from photos. This activity was developed by Professor Keith Pecor for his Ecology class at The College of New Jersey.

- BirdBeakAdaptations.doc - 04/24/2013 - 15:21

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U-M Ecology and Evolutionary Biology
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VARK

Measuring Bite Force from Skulls
Mar 05, 2013 - 21:49 - **Tanya Dewey**


An activity designed by Ben Wasleske and Sylia Bautista, students in a Mammalogy course taught by Dr. Chris Yahnke, University of Wisconsin - Stevens Point. The purpose of this lab activity is to use images of dog and cat skulls to calculate maximum estimated bite force. The activity uses Quaardvark and Image J, a free online photo tool. Attached as well is a spreadsheet with formulas to calculate maximum estimated bite force from measurements of skull dimensions taken with ImageJ from specimen images.

- MEBFCalculatorforImageJ.xlsx - 03/06/2013 - 12:55
- BiteForcefromSkulls.docx - 02/15/2013 - 12:59

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Query *What group of animals are you interested in searching?*

Animal Group "Chiroptera" [Edit](#) [Add condition](#) [Delete](#)

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[Search Text](#)
[Biogeographic Regions](#)
[Other Geographic Terms](#)

Select an element

[Cancel](#)

Habitat
Physical Description
Development
Reproduction: Mating Systems
Reproduction: General Behavior
Reproduction: Parental Investment
Lifespan/Longevity
Behavior
Communication and Perception
Food Habits
Predation
Ecosystem Roles
Economic Importance for Humans: Positive
Economic Importance for Humans: Negative
Conservation Status
Other Comments
Media Assets: Specimens
Media Assets: Subjects



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Query *What group of animals are you interested in searching?*

Animal Group

"Chiroptera"

Edit

Add condition

Delete

Taxon Information

Geographic Range



Search Text



Biogeographic Regions



Other Geographic Terms

Habitat

Physical Description

Development

Reproduction: Mating Systems

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Reproduction: Parental Investment

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Ecosystem Roles

Economic Importance for Humans: Positive

Economic Importance for Humans: Negative

Conservation Status

Other Comments

Media Assets: Specimens

Media Assets: Subjects

Biogeographic Regions

☒ Nearctic

☐ Introduced

☒ Native

☐ Palearctic

☐ Introduced

☐ Native

☐ Oriental

☐ Introduced

☐ Native

☐ Ethiopian

☐ Introduced

☐ Native

☐ Neotropical

☐ Introduced

☐ Native

☐ Australian

☐ Introduced

☐ Native

☐ Antarctica

☐ Introduced

☐ Native

☐ Oceanic Islands

☐ Introduced

☐ Native

☐ Arctic Ocean

☐ Introduced

☐ Native

☐ Indian Ocean

☐ Introduced

☐ Native

☐ Atlantic Ocean

☐ Introduced

☐ Native

☐ Pacific Ocean

☐ Introduced

☐ Native

☐ Mediterranean Sea

☐ Introduced

☐ Native

Select Introduced


Select Native


Cancel

Save Changes

Query for bats
native to the
Nearctic.

- flexible queries to explore hypotheses

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Query *What group of animals are you interested in searching?*

Animal Group "Chiroptera" [Edit](#) [Add condition](#) [Delete](#)

Geographic Range > Biogeographic Regions Nearctic :: Native [Delete](#) [Edit](#)

[Add animal group](#)

Report *What do you want to know about them?*

Taxonomic Ranks > Species

Taxonomic Ranks > Class ... [Edit](#) [Move Up](#) [Move Down](#) [Delete](#)

Taxonomic Ranks

Select an element

[Family](#)
[Order](#)
[Class](#)

Taxon Information

Geographic Range
Habitat
Physical Description
Development
Reproduction: Mating Systems

[Cancel](#)



[Hide Query Setup](#)[Show Backpack](#)[Save to Backpack](#)[Home](#) | [Using Quaaardvark](#) | [Logout](#)**Query** *What group of animals are you interested in searching?***Animal Group**

"Chiroptera"

[Edit](#)[Add condition](#)[Delete](#)**Geographic Range >
Biogeographic Regions**

Nearctic :: Native

[Delete](#)[Edit](#)[Add animal group](#)Report primary
diet.**Report** *What do you want to know about them?***Taxonomic Ranks > Species****Taxonomic Ranks > Family**

...

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Physical Description > Mass**

Average (g)

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Taxonomic Ranks**

Taxon Information

[Geographic Range](#)[Habitat](#)[Physical Description](#)[Development](#)[Reproduction: Mating Systems](#)[Reproduction: General Behavior](#)[Reproduction: Parental Investment](#)[Lifespan/Longevity](#)[Behavior](#)[Communication and Perception](#)[Food Habits](#)

- [Primary Diet](#)
- [Animal Foods](#)
- [Plant Foods](#)
- [Other Foods](#)
- [Foraging Behavior](#)

[Predation](#)[Ecosystem Roles](#)**Primary Diet**☒ List keywords under a column **Primary Diet**☐ Report keywords in their own column

If the keyword is present, Y/N is reported.

- ☐ Carnivore [Q](#)
(eats animal tissue)
 - ☐ Eats terrestrial vertebrates
 - ☐ Piscivore [Q](#)
(eats fish)
 - ☐ Eats eggs
 - ☐ Sanguivore [Q](#)
(drinks blood)
 - ☐ Eats body fluids
 - ☐ Insectivore [Q](#)
(eats insects)
 - ☐ Eats non-Insect arthropods
(crustaceans, arachnids, etc.)
 - ☐ Molluscivore [Q](#)
(eats snails, bivalves, squid, etc.)
 - ☐ Vermivore
(eats worms)

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Report *What do you want to know about them?*

Taxonomic Ranks > Species**Taxonomic Ranks > Family**

...

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Physical Description > Mass**

Average (g)

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Food Habits > Primary Diet**

List keywords

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Taxonomic Ranks**

Taxon Information

[Geographic Range](#)[Habitat](#)[Physical Description](#)[Development](#)[Reproduction: Mating Systems](#)[Reproduction: General Behavior](#)[Reproduction: Parental Investment](#)[Lifespan/Longevity](#)[Behavior](#)[Communication and Perception](#)[Food Habits](#)[Predation](#)[Ecosystem Roles](#)[Economic Importance for Humans: Positive](#)[Economic Importance for Humans: Negative](#)[Conservation Status](#)[Other Comments](#)**Media Assets: Specimens**

- ☐ Foot
- ☐ Forefoot
- ☐ Forelimb
- ☐ Hindfoot
- ☐ Lower Jaw
- ☐ Skull
- ☐ Teeth
- ☐ Vertebrae

Media Assets: Subjects**Specimen: Skull**☒ Skull

- ☒ Alisphenoid Canal
- ☒ Basicranial View
- ☒ Basisoccipital
- ☒ Bullae
- ☒ Dorsal View
- ☒ Frontal View
- ☒ Horns
- ☒ Infraorbital Foramen
- ☒ Lateral View
- ☒ Maxillary-Premaxillary Junctionure
- ☒ Nasal
- ☒ Nasal-Premaxillary Relationship
- ☒ Orbit
- ☒ Palate
- ☒ Palatine View Premaxillary
- ☒ Ventral View
- ☒ Zygomatic Plate

☒ Only include species with media assets matching this terms

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Show images
of skull
morphology.

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Query *What group of animals are you interested in searching?*

Animal Group

"Chiroptera"

[Edit](#)[Add condition](#)[Delete](#)[Add animal group](#)

Select
"submit."

Report *What do you want to know about them?*

Taxonomic Ranks > Species**Taxonomic Ranks > Family**

...

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Geographic Range > Biogeographic Regions**List
keywords[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Physical Description > Mass**

Average (g)

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Food Habits > Primary Diet**

List keywords

[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)**Media Assets: Specimens > Specimen: Skull**Skull ::
Ventral
View[Edit](#)[Move Up](#)[Move Down](#)[Delete](#)[Add more data](#)[Reset Form](#)[Submit](#)

Please keep in mind that Animal Diversity Web data are incomplete. We rely on contributions from students for our accounts and data, and there are sometimes inaccuracies or missing information. We're working to provide a rich source of data for the more than 3000 animal taxa represented here. If you find errors, we would be grateful if you would [report them](#).

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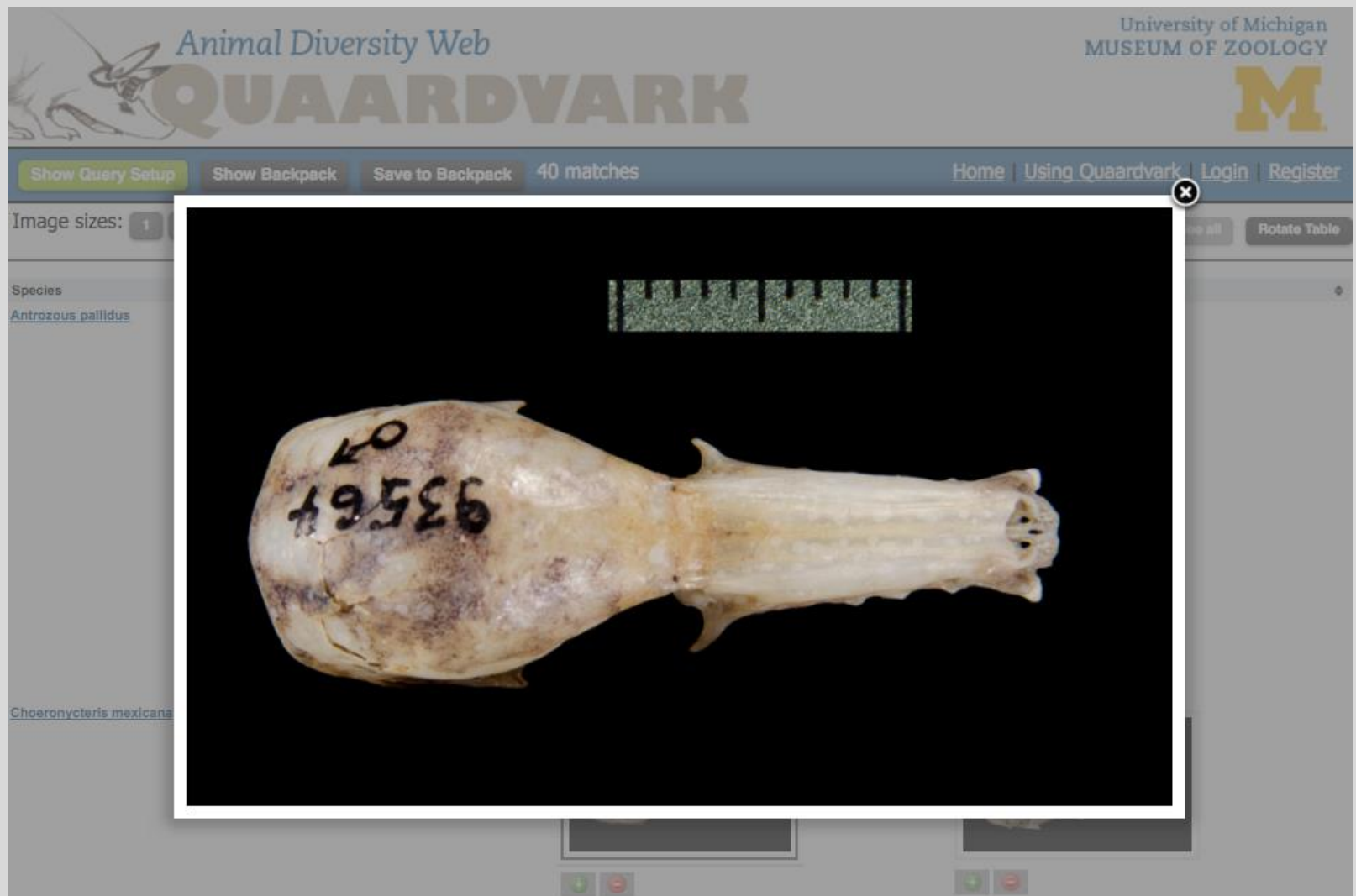
Rotate Table

Species	Antrozous pallidus	Choeronycteris mexicana	Corynorhinus rafinesquii	Corynorhinus townsendii	Desmodus rotundus	Diphylla ecaudata	Eptesicus fuscus	Eumops perotis
Family	Vespertilionidae	Phyllostomidae	Vespertilionidae	Vespertilionidae	Phyllostomidae	Phyllostomidae	Vespertilionidae	Molossidae
Mass - g	22.5	25	10	9	32.5	35	23	57
Primary Diet	<ul style="list-style-type: none"> Carnivore Carnivore :: Insectivore 	<ul style="list-style-type: none"> Herbivore Herbivore :: Frugivore Herbivore :: Nectarivore 	<ul style="list-style-type: none"> Carnivore Carnivore :: Insectivore 	<ul style="list-style-type: none"> Carnivore Carnivore :: Insectivore 	<ul style="list-style-type: none"> Carnivore Carnivore :: Sanguivore 		<ul style="list-style-type: none"> Carnivore 	<ul style="list-style-type: none"> Carnivore Carnivore
Skull :: Lateral View								
Skull :: Ventral View								


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Report is presented in the browser window and is downloadable.

- flexible queries to explore hypotheses




- flexible queries to explore hypotheses



Animal Diversity Web

QUAARDVARK

University of Michigan
MUSEUM OF ZOOLOGY

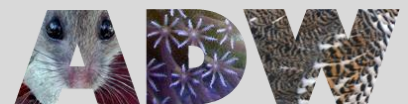


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Species	Family	Mass - average - g	Lifespan (wild, undetermined) - undetermined - average - years
Acinonyx jubatus	Felidae	46500	8
Acrobates pygmaeus	Acrobatidae	13	4
Aepyceros melampus	Bovidae	52500	15
Aepyprymnus rufescens	Potoroidae	2.48	6
Ailuropoda melanoleuca	Ursidae	102500	12.5
Ailurus fulgens	Ailuridae	4950	14
Akodon azarae	Cricetidae	19	0.79
Alcelaphus buselaphus	Bovidae	137500	20
Alces alces	Cervidae	520500	22
Alces americanus	Cervidae	435000	10
Allactodipus bobrinskii	Dipodidae	65	2.5
Allenopithecus nigroviridis	Cercopithecidae	4702.5	23
Alouatta guariba	Atelidae		17.5
Alouatta palliata	Atelidae	6000	20
Alouatta pigra	Atelidae	8900	20
Alouatta seniculus	Atelidae	5500	25
Ammodorcas clarkei	Bovidae	28500	11
Ammospermophilus harrisi	Sciuridae	122	3
Ammospermophilus nelsoni	Sciuridae	155	0.67
Ammotragus lervia	Bovidae	105000	10
Antechinomys laniger	Dasyuridae	25	5.58
Antidorcas marsupialis	Bovidae	39500	20
Antilocapra americana	Antilocapridae	53500	16
Antilope cervicapra	Bovidae	37500	15
Antrozous pallidus	Vespertilionidae	22.5	9
Aonyx capensis	Mustelidae	15800	11
Aotus nigriceps	Aotidae	750	11
Aotus trivirgatus	Aotidae	800	20
Aplodontia rufa	Aplodontiidae	1125	10
Apodemus sylvaticus	Muridae	23.4	1
Arctictis binturong	Viverridae	14500	18
Arctocebus calabarensis	Lorisidae	365.5	13



- image queries of live animals using controlled vocabulary

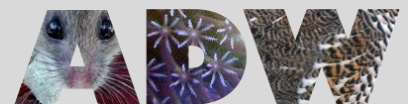
Geographic Range > Biogeographic Regions
List keywords
Edit
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Delete

Taxonomic Ranks
Taxon Information
Geographic Range
Habitat
Physical Description
Development
Reproduction: Mating Systems
Reproduction: General Behavior
Reproduction: Parental Investment
Lifespan/Longevity
Behavior
Communication and Perception
Food Habits
Predation
Ecosystem Roles
Economic Importance for Humans: Positive
Economic Importance for Humans: Negative
Conservation Status
Other Comments
Media Assets: Specimens
Media Assets: Subjects

Life Stages and Gender
☐ Life Stages and Gender
☐ egg
☐ larva
☐ pupa
☐ instar
☐ juvenile
☐ hatchling
☐ fledgling
☐ adult/sexually mature
☐ neotenic
☐ paedomorphic
☒ Only include species with media assets matching this terms
Species without matching media assets will be removed from the report; unchecking this may produce a report with gaps.

Cancel
Save Changes

☐ Live Animal
☐ Life Stages and Gender
☐ Anatomy
☐ Behaviors
☐ Habitat



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Rotate Table

[Dendroica caerulescens](#)

Parulidae

- Nearctic
- Nearctic :: Native
- Neotropical
- Neotropical :: Native



[Dendroica cerulea](#)

Parulidae

- Nearctic
- Nearctic :: Native
- Neotropical
- Neotropical :: Native



[Dendroica coronata](#)

Parulidae

- Nearctic
- Nearctic :: Native
- Neotropical
- Neotropical :: Native



[Dendroica kirtlandii](#)

Parulidae

- Nearctic
- Nearctic :: Native
- Neotropical
- Neotropical :: Native



Nearly limitless inquiries

- students pose hypotheses and explore data on their own
- supports data analysis skills
- supports observation and measurement of specimens

Additional possibilities

- Integrate with other databases (collection, image, range maps, etc.)



External Information Resources (NCBI LinkOut)

LinkOut	Subject	LinkOut Provider
Myotis lucifugus	taxonomy/phylogenetic	Animal Diversity Web



Evidence of efficacy

- exercises built and tested in over 30 classrooms at 20+ institutions
- Over 3000 students evaluated, pre/post-assessment via participant perception indicator tools
- significant increases in student confidence in their ability to formulate and answer scientific hypotheses and manipulate data

Spring 2018



- QUBES Faculty Mentoring Network around using ADW querying in undergraduate classrooms – come join us!



Thank you!

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