

The Semantic Underpinnings of EOL TraitBank

Nathan Wilson
Marine Biological Laboratory

All copyrighted text and images not covered by fair use
Creative Commons Attribution 3.0 License

Who am I?

- Naturalist
- Mycologist
- Software Professional
- Director of Biodiversity Informatics for EOL

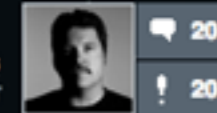


© 2010 Nathan Wilson



Encyclopedia of Life

Nathan
EOL Director of Biodiversity Informatics
[PROFILE](#) • [ADMINS](#) • [CURATORS](#) • [SIGN OUT](#)



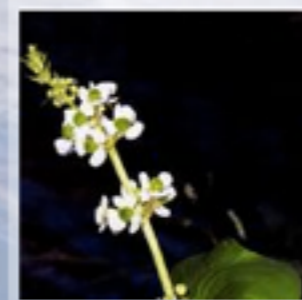
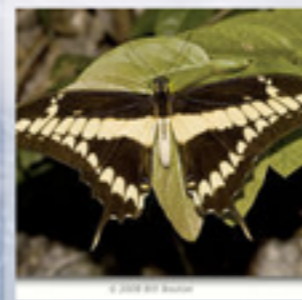
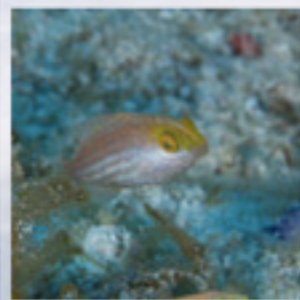
Global access to knowledge about life on Earth

Search EOL ...

GO



Paspalum fimbriatum
Panama Paspalum



EOL News

[see more](#)

[One Species at a Time Podcast: Chinook Salmon](#)

Freshwater fishes are an integral component of our environment, yet large gaps persist in our scientific knowledge of their diversity, distribution, and ecology. Several conservation groups recently joined forces to announce the first "... [more](#)

Community Activity

[see more](#)



[Peter Mangiafico](#) set "[Image of *Canis familiaris*](#)" as an exemplar on "[Canis lupus familiaris Linnaeus, 1758](#)".

ABOUT 2 HOURS AGO

Scientific Names

- **Homonyms**



Aotus



- **Synonyms:**

Lepista nuda, *Rhodopaxillus nudus*,
Tricholoma nudum, *Cortinarius*
nudus, *Clitocybe nuda*, *Tricholoma*
personatum, *Agaricus nudus*



© 2009 Dan Molter



Changing Definitions



© 2013 Martin Livezey



© 2011 Morganella



TraitBank Search Results

[download data](#)

758 results for *Cell shape* within [Bacillariophyta](#)

Select an attribute

Cell shape ▾

[Show search options](#)

search

Selected search options—Taxon group: Bacillariophyta

Cell shape

The approximate three dimensional shape of a cell, described as one or more geometric solids.

http://purl.obolibrary.org/obo/OBA_0000052

[explore full data glossary](#)

Displaying 1 – 30 of 758 records on EOL

[see next 30](#)



Hannaea arcus

Cell shape ▶ sickle-shaped prism

Leblanc et al, ...



Diploneis

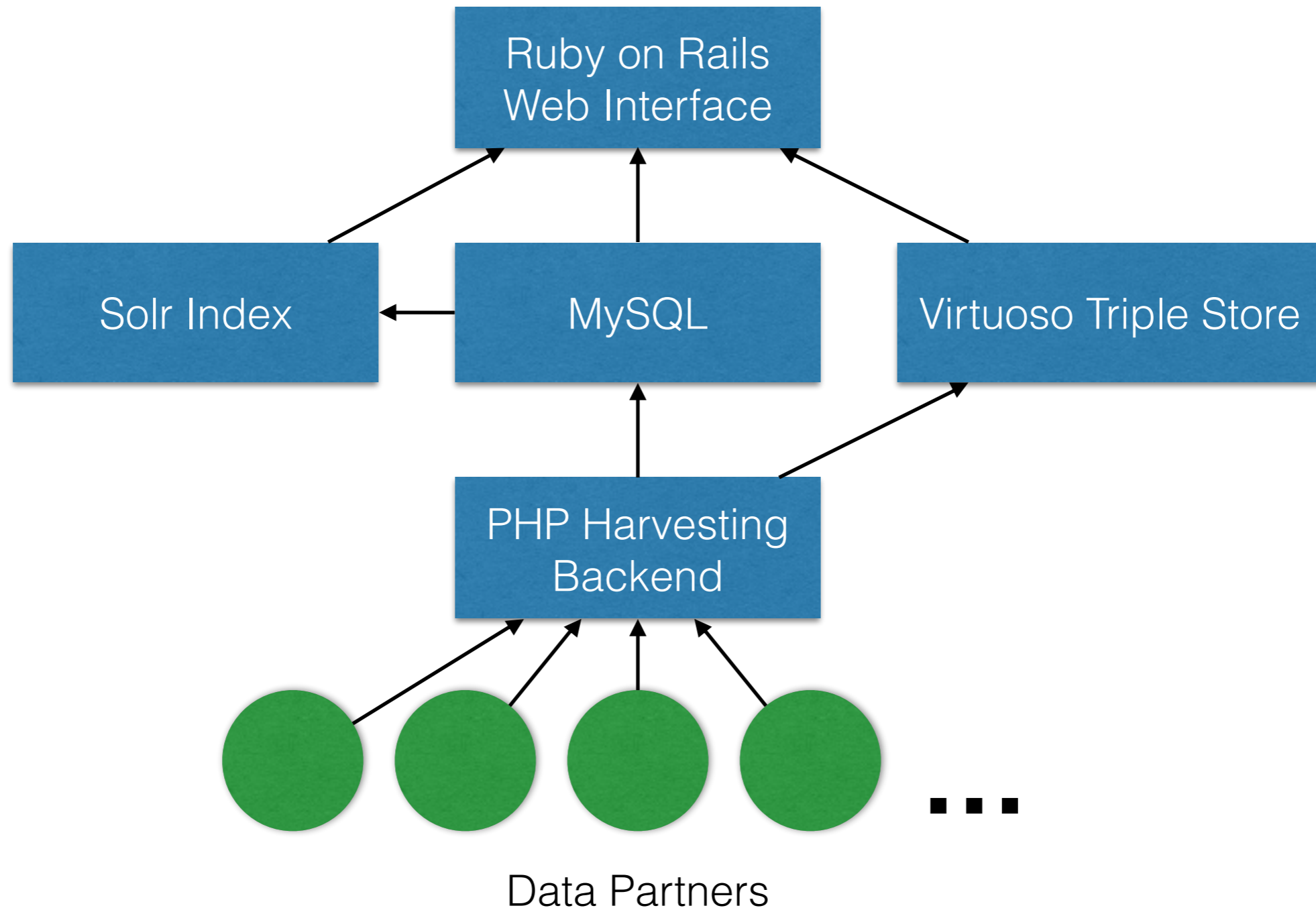
Cell shape ▼ rotational ellipsoid

Olenina et al, ...

Data about this record

Source	http://epic.awi.de/30141/1/bsep106.pdf
Citation	Olenina, I., Hajdu, S., Edler, L., Andersson, A., Wasmund, N., Busch, S., Göbel, J., Gromisz, S., Huseby, S., Huttunen, M., Jaanus, A., Kokkonen, P., Ledaine, I. and Niemkiewicz, E. 2006. Biovolumes and size-classes of phytoplankton in the Baltic Sea. HELCOM Balt.Sea Environ. Proc. No. 106, 144pp.
Individual Count	>=25
Locality	Baltic Sea
Event Date	1980-2006
Sampling Protocol	standard HELCOM (1988) methods. HELCOM, 1988. Guidelines for the Baltic Monitoring Programme for the third stage. Part D. Biological determinands. Balt. Sea Environ. Proc. 27 D, 161 pp.
Link to this record	http://eol.org/pages/11733/data#data_point_2966128

TraitBank Architecture



<http://eol.org/pages/328615/overview>

Zalophus californianus

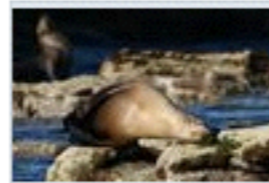
California Sea Lion [learn more about names for this taxon](#)

Tweet 5 Like 4

add to a collection

reindex page

- Overview
- Detail
- Data
- 413 Media
- 8 Maps
- Names
- Community
- Resources
- Literature
- Updates
- Worklist



Zalophus californianus **TRUSTED**

© CONABIO

Source: [Conabio](#)

[see all media](#)
[see all maps](#)

EOL has data for 32 traits

[see all](#)

Habitat	bay biome coastal water more
Body length (VT)	2.02 m (average, adult)
Body mass	137.19 kg (average, adult) 6.35 kg (average, newborn animal) 20.2 kg (average, weanling)
Brood/litter size	1.2 1.41 individuals (average)
Behavioral circadian rhythm	Nocturnal/crepuscular, cathemeral, crepuscular or diurnal/crepuscular
Gestation period duration	349.99 days (average)
Habitat breadth	2
Inter-birth interval	1.5 years (average, female)

<http://eol.org/pages/328615/data>

Zalophus californianus [add to a collection](#)
California Sea Lion [learn more about names for this taxon](#)
[Tweet](#) 0 [Like](#) 0 [reindex page](#)

[Overview](#) [Detail](#) [Data](#) [413 Media](#) [8 Maps](#) [Names](#) [Community](#) [Resources](#) [Literature](#) [Updates](#) [Worklist](#)

[TraitBank](#) assembles data records from many providers. Select a row for more details about the record, or [search within Zalophus californianus](#).

- All
- Distribution
- Physical Description
- Ecology
- Life History and Behavior
- Physiology and Cell Biology
- Conservation

- Glossary
- About

Distribution

Latitude (min)	▷ 21.99 degrees	OBIS Environmental Information
(max)	▷ 48.2 degrees	OBIS Environmental Information
Longitude (min)	▷ -129 degrees	OBIS Environmental Information
(max)	▷ -82.7 degrees	OBIS Environmental Information
Geographic distribution	▷ East North Pacific	World Register of Marine Spe...
	▷ Gulf of Mexico	World Register of Marine Spe...

<http://eol.org/pages/328615/data>

Seawater O2 saturation (max)	▶ 105.46 percent	OBIS Environmental Information
(min)	▶ 35.49 percent	OBIS Environmental Information
Has predator	▶ Bull Shark	Global Biotic Interactions
	▶ Great White Shark	Global Biotic Interactions
	▶ Killer Whale	Global Biotic Interactions
Seawater salinity (min)	▶ 30.38 PSU	OBIS Environmental Information
(max)	▶ 35.3 PSU	OBIS Environmental Information

<http://eol.org/pages/224769/data>

Carcharhinus leucas

Bull Shark

[learn more about names for this taxon](#)

add to a collection

reindex page

Tweet 0 Like 0

Overview Detail **Data** 48 Media 7 Maps Names Community Resources Literature Updates Worklist

[TraitBank](#) assembles data records from many providers. Select a row for more details about the record, or [search within *Carcharhinus leucas*](#).

Distribution

Latitude (min)	▶ -35.9 degrees	OBIS Environmental Information
(max)	▶ 39.53 degrees	OBIS Environmental Information
Longitude (min)	▶ -116 degrees	OBIS Environmental Information
(max)	▶ 153.25 degrees	OBIS Environmental Information
Geographic distribution	▶ Azores Exclusive Economic Zone	World Register of Marine Spe...
	▶ European waters (ERMS scope)	World Register of Marine Spe...
	▶ Gulf of Mexico	World Register of Marine Spe...

All

Distribution

Physical Description

Ecology

Life History and Behavior

Glossary

About

<http://eol.org/pages/224769/data>









Ecology

Feeds on	▶ Atlantic Sharpnose Shark	Global Biotic Interactions
	▶ California Sea Lion	Global Biotic Interactions
	▶ Crustaceans	Global Biotic Interactions
	▶ Gray Mullet	Global Biotic Interactions
	▶ Hardhead Catfish	Global Biotic Interactions
	▶ Little Tunny	Global Biotic Interactions
	▶ Molluscs	Global Biotic Interactions
	▶ North American Searobins	Global Biotic Interactions
	▶ Ray-finned Fishes	Global Biotic Interactions
	▶ Sharks	Global Biotic Interactions

[Show 2 more...](#)























http://eol.org/known_uris (admins only)

URIs for Data on EOL

measurements	associations	values	metadata	Previous 1 2 3 4 Next		
URI	Name	Type of URI	Categories	Actions		
http://purl.obolibrary.org/obo/TO_0000537	Flower color	measurement	Physical Description	edit • delete • recommend term	 	
http://purl.obolibrary.org/obo/TO_0000326	Leaf color	measurement	Physical Description	edit • delete • recommend term	 	
http://eol.org/schema/terms/FruitSeedColor	Fruit or seed color	measurement	Physical Description	edit • delete • recommend term	 	
http://eol.org/schema/terms/PlantHabit	Plant growth habit	measurement	Physical Description	edit • delete • recommend term	 	

http://eol.org/known_uris (admins only)

URIs for Data on EOL

measurements	associations	values	metadata	
URI	Name	Type of URI	Categories	Actions
http://eol.org/schema/terms/affects_breeding_of	affects breeding of	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/interactsWith	interacts with	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/hosts	hosts	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/hasHost	has host	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/hasPollinator	has pollinator	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/preysUpon	preys upon	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/eats	feeds on	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/isFoundOn	is found on	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/parasitizes	parasitizes	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/hasParasite	has parasite	association	Ecology	edit • delete • recommend term  
http://eol.org/schema/terms/pollinates	pollinates	association	Ecology	edit • delete • recommend term  

http://eol.org/known_uris (admins only)

URIs for Data on EOL

URI

http://eol.org/schema/terms/affects_breeding_of

Name

affects breeding of

Definition

e.g. An entity responsible for making contributions to the resource.

Attribution

e.g. from Dublin Core; see <http://dublincore.org/usage/terms/history/#contributorT-001>.

Comment

e.g. Examples of a Contributor include a person, an organization, or a service.

Ontology information url

e.g. <http://dublincore.org/documents/dcmi-terms/>

Type of URI

association

Ontology source url

e.g. <http://dublincore.org/2012/06/14/dcterms.rdf>

Exclude from Overview

Yes

Use for Taxonomic Group Ranges

Yes

Categories

Distribution

Physical Description

Ecology

Life History and Behavior

Use as exemplar Taxonomic Group Range

Yes

Values will not be URIs, only text

Yes

http://eol.org/known_uris (admins only)

- Physical Description
- Ecology
- Life History and Behavior
- Evolution and Systematics
- Physiology and Cell Biology
- Molecular Biology and Genetics
- Conservation
- Relevance to Humans and Ecosystems
- Notes
- Names and Taxonomy
- Database and Repository Coverage

Yes

[Cancel](#)

Add A Relationship

affects breeding of

http://eol.org/known_uris (admins only)

- Physical Description
- Ecology
- Life History and Behavior
- Evolution and Systematics
- Physiology and Cell Biology
- Molecular Biology and Genetics
- Conservation
- Relevance to Humans and Ecosystems
- Notes
- Names and Taxonomy
- Database and Repository Coverage

Yes

[Cancel](#)

Add A Relationship

affects breeding of

http://eol.org/data_search?attribute=http%3A%2F%2Fpurl.obolibrary.org%2Fobo%2FVT_0001256&sort=desc

TraitBank Search Results

7553 results for *Body length (VT)*

[download data](#)

Select an attribute

Body length (VT)

[Show search options](#)

[search](#)

Body length (VT)

The distance from point to point along the longest axis of the body of an organism.

http://purl.obolibrary.org/obo/VT_0001256

[explore full data glossary](#)

Displaying 1 – 30 of 7553 records on EOL

[see next 30](#)



Balaenoptera musculus

[Blue Whale](#)

Body length (VT) ▶ 30.48 m (adult)
(average)

PanTHERIA



Balaenoptera physalus

[Fin Whale](#)

Body length (VT) ▶ 20.64 m (adult)
(average)

PanTHERIA

http://eol.org/data_glossary

Data Glossary

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#) <#>

Filter by subject

- | | |
|--|---|
| <input type="checkbox"/> Distribution | <input type="checkbox"/> Molecular Biology and Genetics |
| <input type="checkbox"/> Physical Description | <input type="checkbox"/> Conservation |
| <input type="checkbox"/> Ecology | <input type="checkbox"/> Relevance to Humans and Ecosystems |
| <input type="checkbox"/> Life History and Behavior | <input type="checkbox"/> Notes |
| <input type="checkbox"/> Evolution and Systematics | <input type="checkbox"/> Names and Taxonomy |
| <input type="checkbox"/> Physiology and Cell Biology | <input type="checkbox"/> Database and Repository Coverage |

To contribute new terms to this glossary, [consider uploading data](#).

A

Above ground dwelling

An organism that spends most of its time above ground.

<http://eol.org/schema/terms/aboveGroundDwelling>

[link to this term](#) • [top](#)

Abyssal zone (4000-6000m)

http://polytraits.lifewatchgreece.eu/terms/DZ_ABY

[link to this term](#) • [top](#)

TraitBank Ontologies

- Environment Ontology - <http://purl.obolibrary.org/obo/envo.owl>
- Plant Trait Ontology - <http://purl.obolibrary.org/obo/to.owl>
- Phenotypic Quality Ontology - <http://purl.obolibrary.org/obo/pato.owl>
- Units of Measure - <http://purl.obolibrary.org/obo/uo.owl>
- Terms from Darwin Core - <http://www.tdwg.org/standards/450/>
- Custom EOL - e.g., <http://eol.org/schema/terms/FruitSeedColor>

Contributing

- Names, Images, Text:
<http://eol.org/info/contribute>
- Semantic Data:
http://eol.org/contact_us?subject=Contribute
- Darwin Core Archive Format:
<http://www.gbif.org/resources/2551>

Getting Data

- UI for exploration
- Data Downloads
 - Preferred by current scientific community
 - Easy to cache

Future Development

- Keep Focus on Downloads
 - All Attributes for a Taxon
 - Multiple Selected Attributes
- User Added Data Later

Thanks!

- Sloan Foundation
- Marine Biological Laboratory
- Patrick Leary, Anthony Goddard, Jeremy Rice, Kristen Lans, Bob Corrigan, Cyndy Parr, Katja Schultz, Jen Hammock, Marie Studer



© 2002 Nathan Wilson