subjectPart and subjectOrientation Controlled Vocabularies User Guide

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Part of TDWG Standard: Not part of any standard
Abstract: This user guide provides information and examples showing how to use subjectPart and subjectOrientation Controlled Vocabularies and associated resources to describe the content of images depicting organisms.
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Introduction

Biodiversity Information Standards (TDWG) is an international organization that develops standards for sharing biodiversity metadata. Audiovisual Core (formerly Audubon Core) is the TDWG standard for describing multimedia resources.

The Audiovisual Core properties *subjectPart* and *subjectOrientation* are used to categorize images for searching and display. Each possible value for these two terms is considered a *concept* and can be denoted either by a *controlled value string* or by an *internationalized resource identifier (IRI)*. The controlled value string resembles an English word or words (e.g. femaleCone) and is easy for humans to type. The IRI (e.g. http://rs.tdwg.org/acpart/values/p0007) is globally unique and can be used for machine processing. Because a controlled value string and an IRI represent the same concept, they are interchangeable.

The purpose of this guide is to provide guidance and examples for selecting and applying the controlled values to images and regions of interest (designated parts of images).

This guide was created by modifying the 2022-02-09 Views Controlled Vocabularies testing notes for test implementers of the vocabularies.

Reference resources

- subjectPart controlled vocabulary: http://rs.tdwg.org/ac/doc/part/
- subjectOrientation controlled vocabulary: http://rs.tdwg.org/ac/doc/orient/
- Categorized lists:
    a. https://ac.tdwg.org/orient_collections
    b. https://ac.tdwg.org/part_collections

Additional resources (CSV and JSON files) are linked in the text below.

Terminology

View

A "view" is a non-technical term for a description of the organism part and orientation of an image.

Broader concepts

Some narrow concepts are linked to broader concepts. For example, left and right subjectOrientations have the broader concept "lateral". Because of this relationship, it is possible to infer that a "right" orientation is also a "lateral" orientation. Generally, it is preferable to provide the narrowest concept possible unless it is not possible for the user to differentiate between the narrower categories and the user needs to select the broader category.

To discover the broader relationships

- look in the skos_broader column of the two controlled value spreadsheets https://github.com/tdwg/rs.tdwg.org/blob/master/acpart/acpart.csv and https://github.com/tdwg/rs.tdwg.org/blob/master/acorient/acorient.csv
- look in the "Has broader concept" term metadata field in the two term lists http://rs.tdwg.org/ac/doc/part/ and http://rs.tdwg.org/ac/doc/orient/
- look for skos:broader values in the machine-readable JSON-LD at https://tdwg.github.io/rs.tdwg.org/cvJson/acpart.json and https://tdwg.github.io/rs.tdwg.org/cvJson/acorient.json

Regions of Interest

A region of interest (ROI) is a designated part of a media item. Each ROI in an image can be assigned its own values for subjectPart and subjectOrientation. Thus an image with several regions of interest may have multiple records for these two terms. Here is an example (region of interest outlined in yellow):

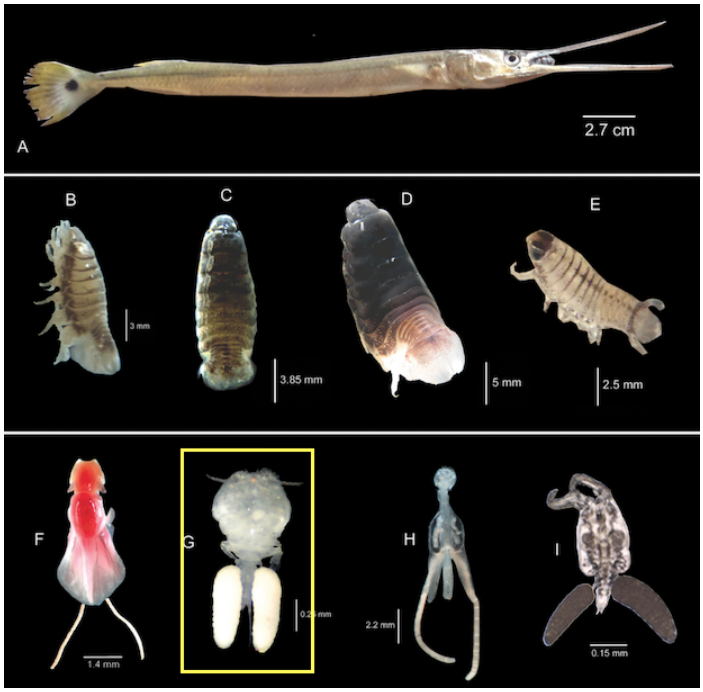


Image IRI: https://zenodo.org/record/959321
Image file name: big_34616.jpg
ROI IRI: https://zenodo.org/record/959321#g
subjectPartLiteral: entireOrganism
subjectOrientationLiteral: dorsal

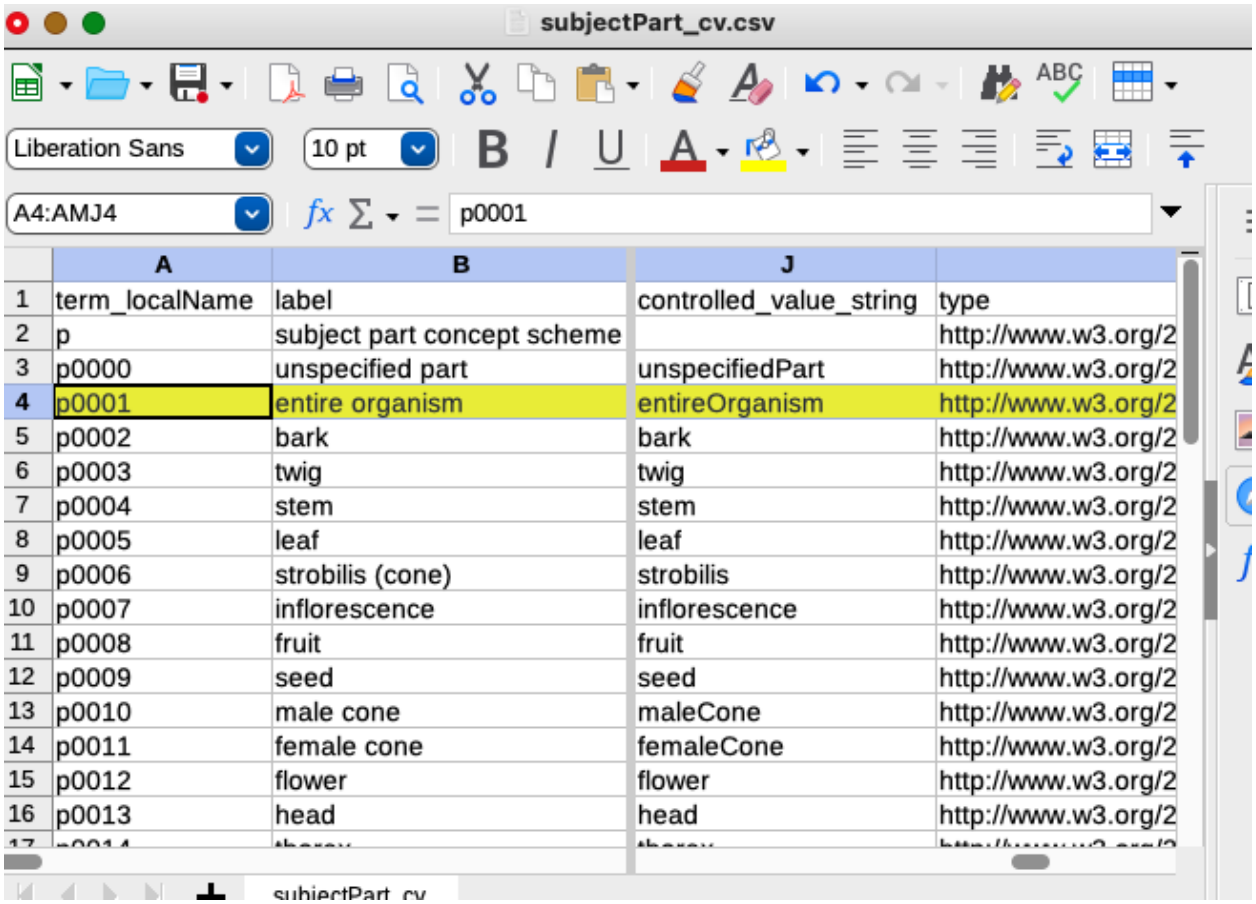
Ways to apply values.

1. Manual entry.

The users examine an image and use the lists or spreadsheets of concepts to determine the controlled value appropriate for the image, then enter the value in a spreadsheet containing metadata about that image. Here are some examples:

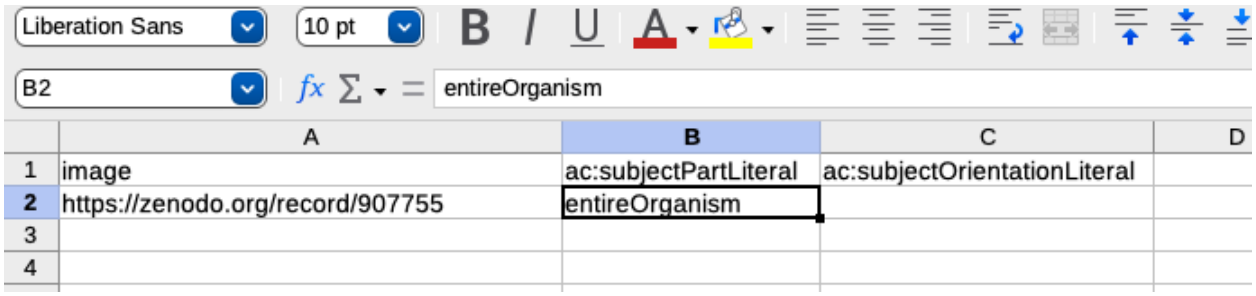
Image of a live fish

The user refers to the spreadsheet of controlled values for subjectPart at https://github.com/tdwg/rs.tdwg.org/blob/master/acpart/acpart.csv and selects the appropriate controlled value string for an entire organism: "entireOrganism".



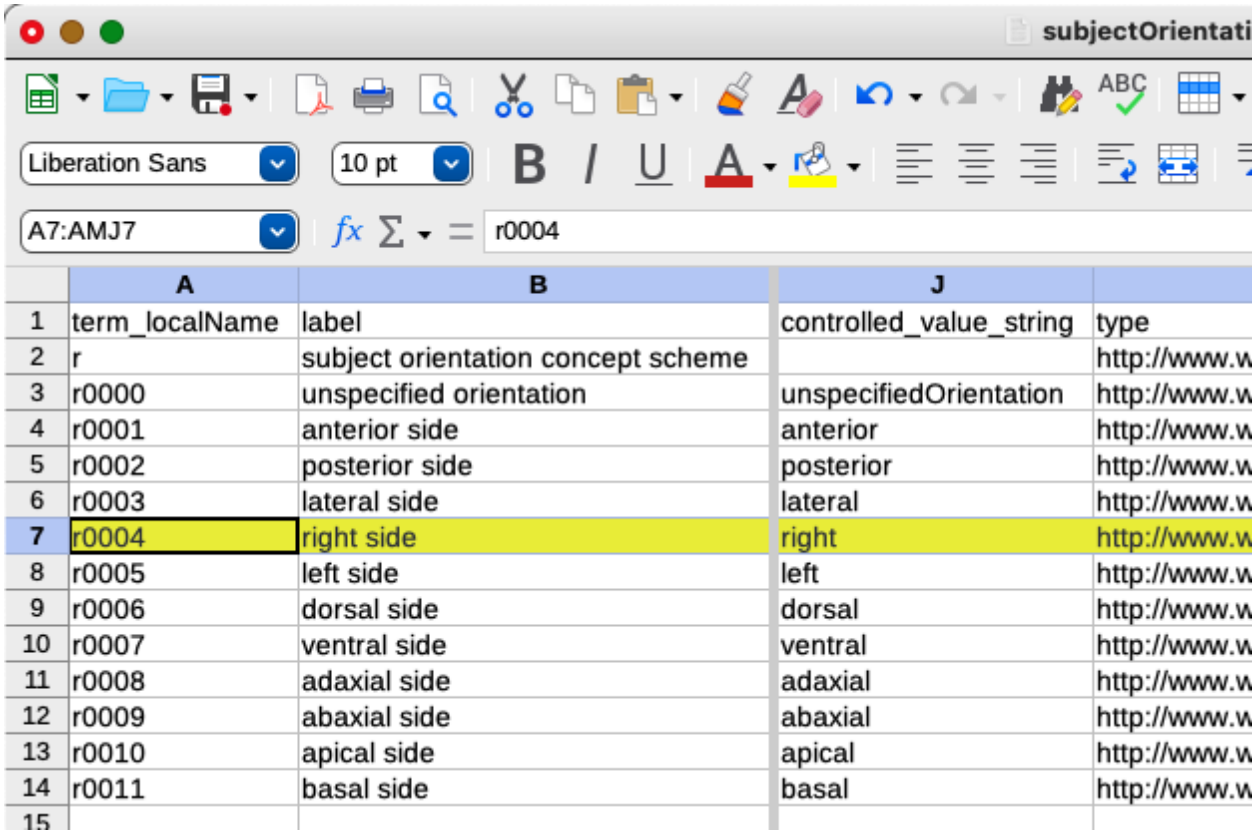
	A	B	J	
1	term_localName	label	controlled_value_string	type
2	p	subject part concept scheme		http://www.w3.org/2
3	p0000	unspecified part	unspecifiedPart	http://www.w3.org/2
4	p0001	entire organism	entireOrganism	http://www.w3.org/2
5	p0002	bark	bark	http://www.w3.org/2
6	p0003	twig	twig	http://www.w3.org/2
7	p0004	stem	stem	http://www.w3.org/2
8	p0005	leaf	leaf	http://www.w3.org/2
9	p0006	strobilis (cone)	strobilis	http://www.w3.org/2
10	p0007	inflorescence	inflorescence	http://www.w3.org/2
11	p0008	fruit	fruit	http://www.w3.org/2
12	p0009	seed	seed	http://www.w3.org/2
13	p0010	male cone	maleCone	http://www.w3.org/2
14	p0011	female cone	femaleCone	http://www.w3.org/2
15	p0012	flower	flower	http://www.w3.org/2
16	p0013	head	head	http://www.w3.org/2

The user enters this value into the spreadsheet:



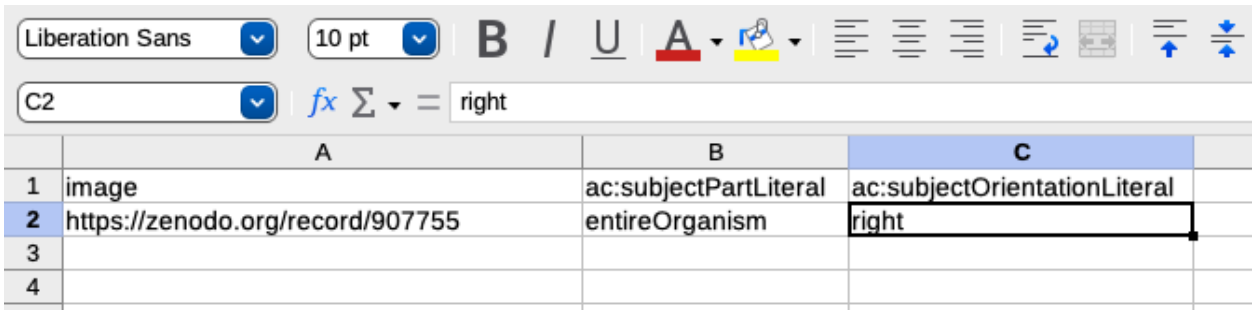
	A	B	C	D
1	image	ac:subjectPartLiteral	ac:subjectOrientationLiteral	
2	https://zenodo.org/record/907755	entireOrganism		
3				
4				

The user refers to the spreadsheet of controlled values for subjectOrientation at https://github.com/tdwg/rs.tdwg.org/blob/master/acorient/acorient.csv and selects the appropriate controlled value string for the right side of the organism: "right".



	A	B	J	
1	term_localName	label	controlled_value_string	type
2	r	subject orientation concept scheme		http://www.w
3	r0000	unspecified orientation	unspecifiedOrientation	http://www.w
4	r0001	anterior side	anterior	http://www.w
5	r0002	posterior side	posterior	http://www.w
6	r0003	lateral side	lateral	http://www.w
7	r0004	right side	right	http://www.w
8	r0005	left side	left	http://www.w
9	r0006	dorsal side	dorsal	http://www.w
10	r0007	ventral side	ventral	http://www.w
11	r0008	adaxial side	adaxial	http://www.w
12	r0009	abaxial side	abaxial	http://www.w
13	r0010	apical side	apical	http://www.w
14	r0011	basal side	basal	http://www.w
15				

The user enters this value into the spreadsheet:

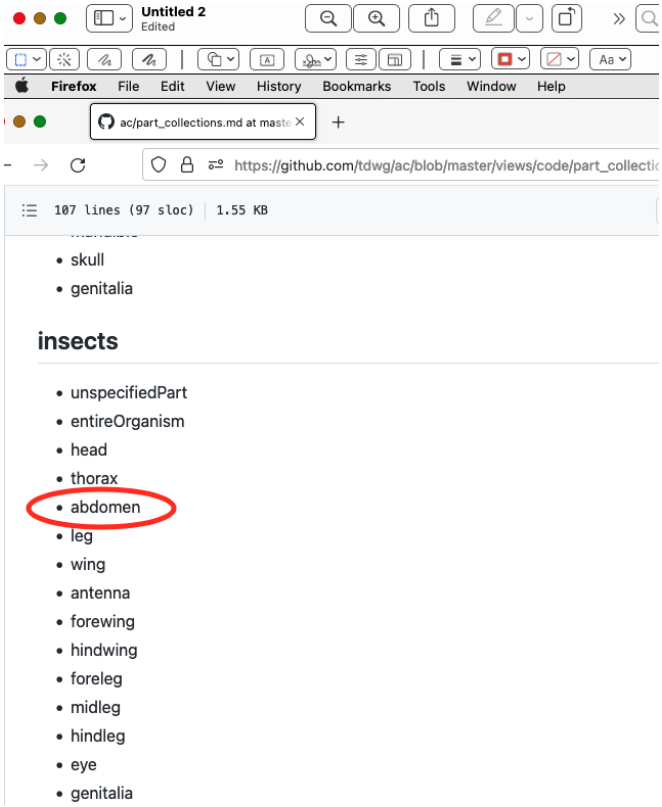


	A	B	C
1	image	ac:subjectPartLiteral	ac:subjectOrientationLiteral
2	https://zenodo.org/record/907755	entireOrganism	right
3			
4			

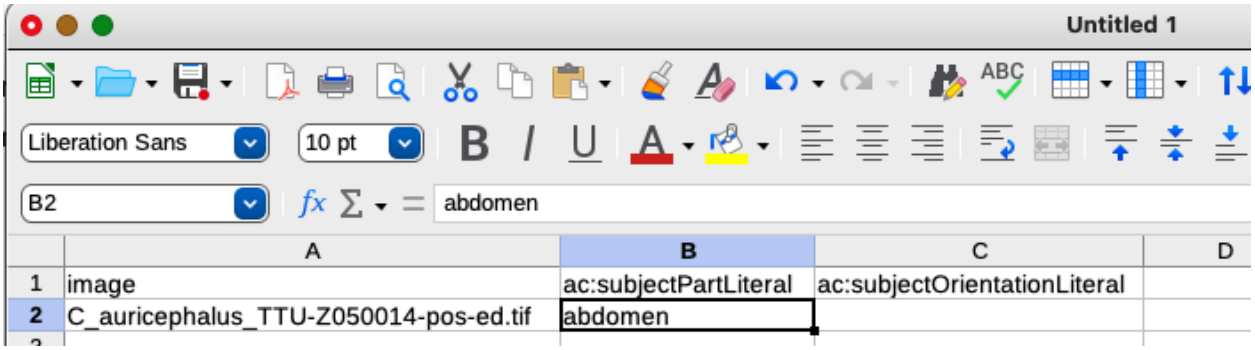
Image of an insect specimen

Image from Fig. 3.D. https://doi.org/10.3897/BDJ.8.e55474

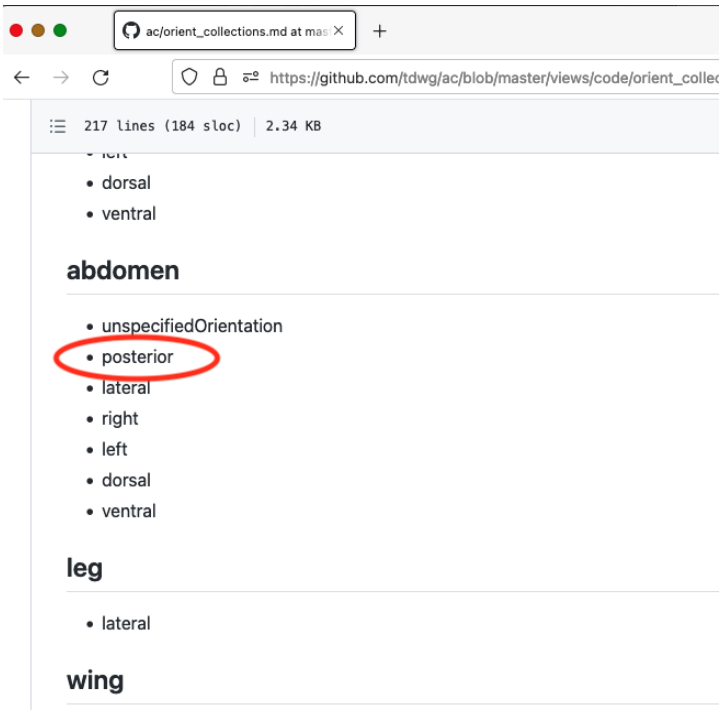
The user refers to the web page listing controlled value strings appropriate for different organism groups at https://ac.tdwg.org/part_collections and finds the list for insects.



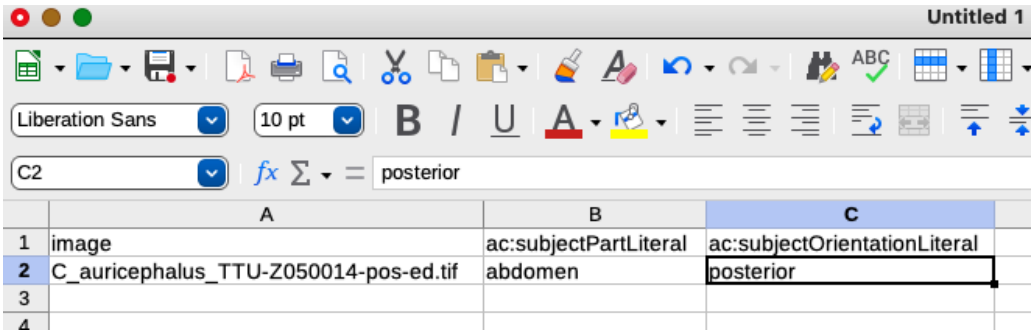
The user selects the value "abdomen" and enters it into a spreadsheet.



The user refers to the web page listing controlled value strings appropriate for different subject parts at https://ac.tdwg.org/orient_collections and finds the list for abdomen:

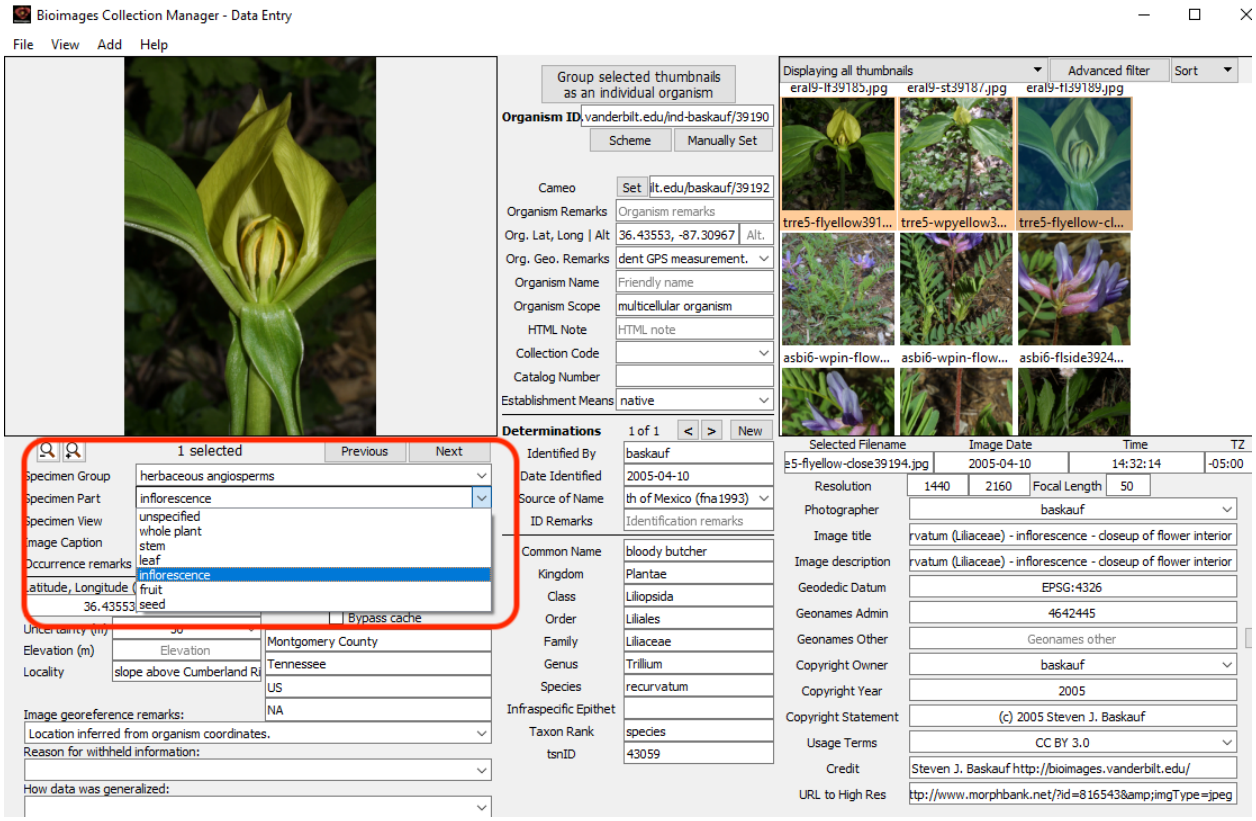


The user selects the value "posterior" and enters it into a spreadsheet.



2. Machine-guided entry

The users examine images that are presented by a content management system (CMS). The CMS guides the user to select concepts that are appropriate for a particular organism group or subjectPart using dropdown menus or some other system. Here is an example:



The user selected the organism group label "herbaceous angiosperms" and the subjectPart collections data were used to determine which subjectParts were appropriate for that organism group. The CMS used this selection to assign the value

ac:subjectPart = http://rs.tdwg.org/acpart/values/p0007

to assign the IRI for "inflorescence" to the property ac:subjectPart, whose values are intended to be IRIs. The user would then be presented with a picklist of subjectOrientations that are appropriate for inflorescences, based on the subjectOrientation collections data. In this case, the user would select "lateral" from the dropdown and the CMS would assign the value

ac:subjectOrientation = http://rs.tdwg.org/acorient/values/r0003

since the property ac:subjectOrientation is expected to have an IRI value.

The following JSON files may be useful for setting up the CMS to generate the dropdowns:

subjectPart collection providing parts appropriate for different organism groups: https://tdwg.github.io/rs.tdwg.org/cvJson/acpart_collection.json

metadata about subjectPart concepts (labels, definitions, controlled value strings, broader relationships, ontology links): https://tdwg.github.io/rs.tdwg.org/cvJson/acpart.json

subjectOrientation collection providing orientations appropriate for different organism parts: https://tdwg.github.io/rs.tdwg.org/cvJson/acorient_collection.json

metadata about subjectOrientation concepts (labels, definitions, controlled value strings, broader relationships, ontology links): https://tdwg.github.io/rs.tdwg.org/cvJson/acorient.json

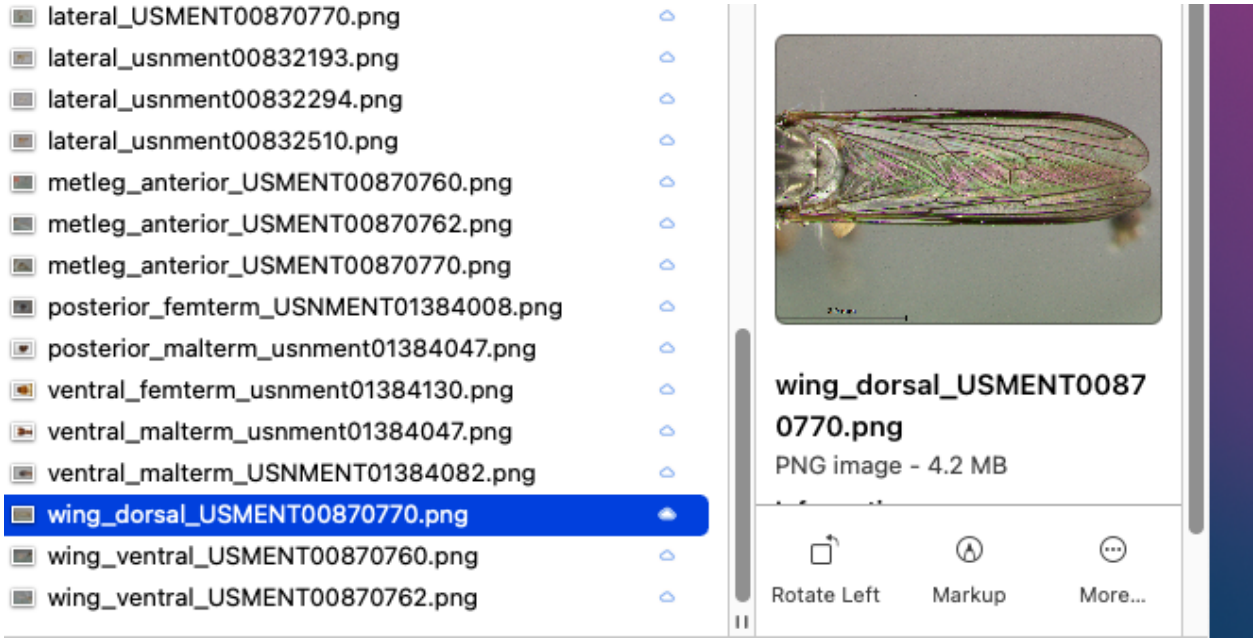
3. Machine processing

Data managers map the controlled value concepts to existing text-based schemes (e.g. text embedded in filenames). Values for subjectPart and subjectOrientation are generated for images using these mappings.

There is no specific algorithm for accomplishing this, but frequently existing identifiers or metadata contain sufficient information to assign at least some of the values automatically. In cases where values are ambiguous, the "unspecifiedPart" (acpart:p0000) and "unspecifiedOrientation" (acorient:r0000) values can be assigned, with later human-mediated processing to assign more specific values.

Example:

The filenames of these images embed information about the body parts:



The file name wing_dorsal_USMENT00870770.png can be split based on underscore positions:

part: "wing"
orientation: "dorsal"
rest of string: USMENT00870770.png

Mappings:
"wing" = http://rs.tdwg.org/acpart/values/p0017
"dorsal" = http://rs.tdwg.org/acorient/values/r0006

Metadata for image:
filename: wing_dorsal_USMENT00870770.png
ac:subjectPart: http://rs.tdwg.org/acpart/values/p0017
ac:subjectOrientation: http://rs.tdwg.org/acorient/values/r0006

For a more extensive example, see the "Machine processing" section of the Implementation Experience Report at http://doi.org/10.3897/biss.7.94188 .