

The Dryad Repository: A New Path for Data Publication in Scholarly Communication

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OCLC
4/25/2011



Metadata Research Center <MRC>



UNC
SCHOOL OF INFORMATION
AND LIBRARY SCIENCE

Overview

- Fundamental, motivating questions
 1. Curation workflow
 - Metadata driven
 2. Metadata research activities
 3. HIVE (Helping Interdisciplinary Vocabulary Engineering)
- Conclusions and questions

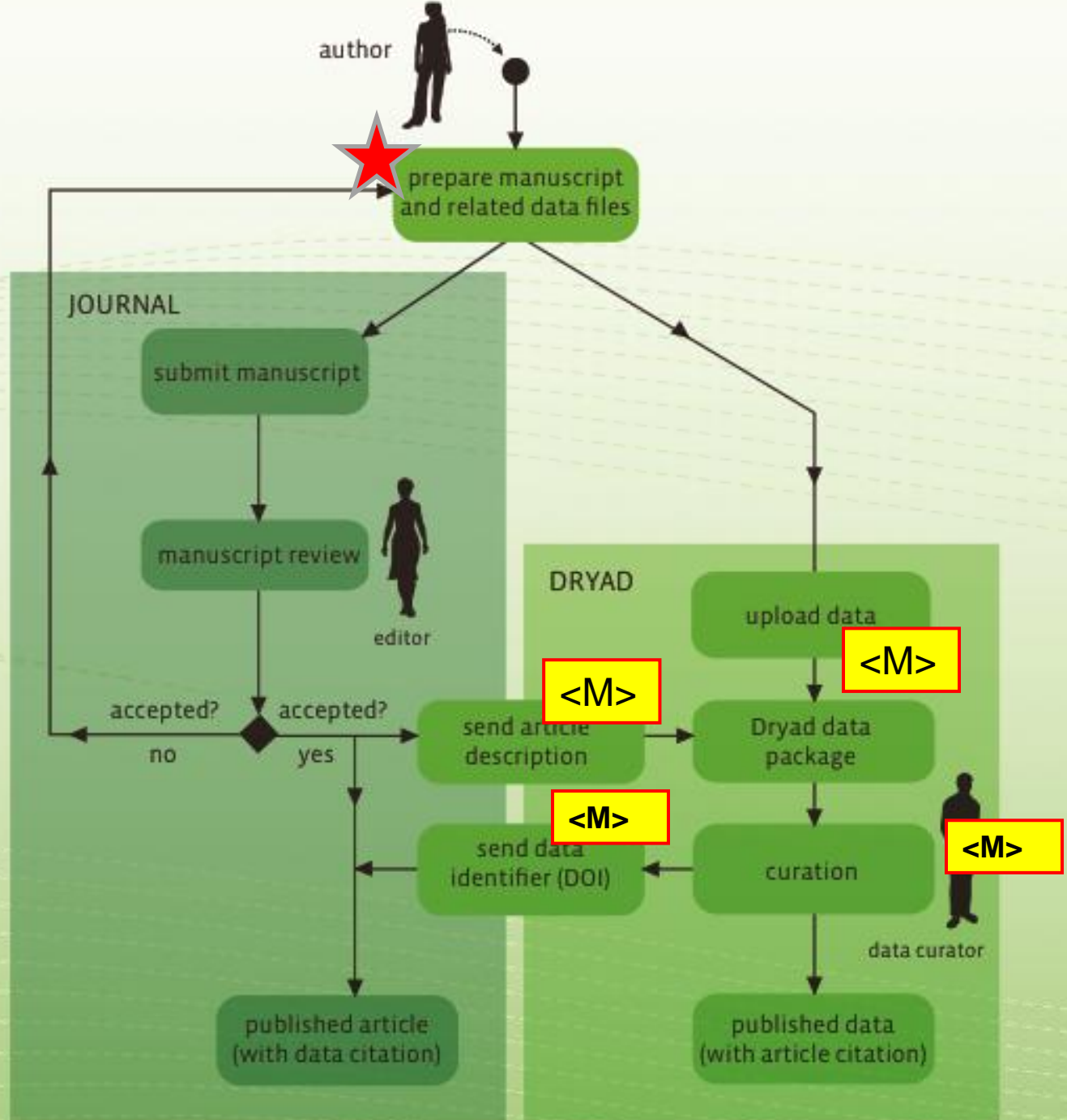
Fundamental, motivating questions

1. Can we implement an optimal metadata generation workflow?
 - ~ Automation for routine activities, assist humans
 - ~ Leverage resource (“data”) creator knowledge
 - ~ Save curator tasks requiring human capacities
2. How can we confirm the best ROI for metadata generation?
 - ~ Cost: Funding, time, human resources
3. Which intellectual and theoretical models best guide metadata work in this context?

Curation workflow

Dryad's workflow

~ low burden
facilitates
submission



From: managing.editor@molecol.com

Date: April 19, 2011 3:09:22 PM EDT

To: Author

Cc: journal-submit@datadryad.org

Subject: Dryad entry for MEC-11-0140.R1

Dear Author

Many thanks for agreeing to participate in the Dryad project. To upload your data, please click the link below- it will take you directly to your entry in the Dryad database.

<http://datadryad.org/submit?journalID=MolEcol&manu=223330>

<deleted text>

Once you have uploaded your data please include the Dryad identifier in your manuscript. Please let me know if you have any questions about this process.

All the best,

Tim Vines,

Managing Editor, Molecular Ecology

Describe publication

Submitting data to Dryad consists of three simple steps:

1. Describe your publication
2. Upload and describe your data files
3. Approve data for publication

Please describe your publication in as much detail as possible. Providing a detailed description will make it easier for other data in Dryad. Please describe the **publication only**. Do not enter information specific to your data files on this page.

Fields marked with an asterisk (*) are required. For more information on expected contents for a field, hold your mouse over the question.

Publication metadata

Title*: Adaptive responses and disruptive effects: how major wildfire

Authors*:

Last name, e.g. *Smith*

First name + initial, e.g. *Donald F.*

- Banks, Sam
- Blyton, Michaela
- Blair, David
- McBurney, Lachlan
- Lindenmayer, David

Journal name*: Molecular Ecology

Abstract: Environmental disturbance is predicted to play a key role in the evolution of animal social behaviour. This is because disturbance affects key factors underlying

Pre-populated
metadata
field

DOI:

Journal issue:
Volume Number Year

Primary contact for data associated with this article:

▼

Subject keywords:

- Behavior/Social Evolution
- Evolutionary Theory
- Mammals
- Phenotypic Plasticity
- Population Dynamics
- Population Genetics - Empirical

Taxonomic names:

Geographic areas covered by this publication:

Geologic timespans covered by this publication:

Data file *

Please upload your data file or provide the identifier of a file located in another repository

External file identifier

(please select a repository) ▾

(please select a repository)

TreeBASE

GenBank

KNB

Data file description

Title*:

Description:

VOL. 177, NO. 4 THE AMERICAN NATURALIST APRIL 2011

Multiple Benefits Drive Helping Behavior of a Breeding Bird: An Integrated Approach

Sjouke A. Kingma,^{1,*} Michelle L. Hall,^{1,2,3} and Anne Peters^{1,4}

1. Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, 78315 Radolfzell, Germany; 2. Australian Wildlife Conservancy, PMB 925, Derby, Western Australia 6728, Australia; 3. Australian National University, Canberra, Australian Capital Territory 0200, Australia; 4. School of Biological Sciences, Monash University, Clayton, Victoria 3800, Australia

Submitted July 23, 2010; Accepted January 3, 2011; Electronically published March 10, 2011

Dryad data: <http://dx.doi.org/10.5061/dryad.8210>.

Data from: Patterns of morphological and plastid DNA variation in the *Corallorhiza striata* species complex (Orchidaceae)

When using this data, please cite the original article:

Barrett CF, Freudenstein JV (2009) Patterns of morphological and plastid DNA variation in the *Corallorhiza striata* species complex (Orchidaceae). *Systematic Botany* 34(3): 496-504. doi:10.1600/036364409789271245 ←

Additionally, please cite the Dryad data package:

Barrett CF, Freudenstein JV (2009) Data from: Patterns of morphological and plastid DNA variation in the *Corallorhiza striata* species complex (Orchidaceae). Dryad Digital Repository. doi:10.5061/dryad.1013 ←

Cite

Dryad Package Identifier

doi:10.5061/dryad.1013 44 views

Individual Data Files

Supplementary Figure 1 37 views 9 downloads
Supplementary Figure 2 34 views 11 downloads

Abstract

Corallorhiza striata is a wide-ranging, morphologically variable, mycoheterotrophic species complex distributed across North America. Objectives of this study were to assess relationships and test validity of previously delimited varieties of *striata*, including the recently described *C. bentleyi*. Two plastid DNA regions were sequenced for individuals from populations across North America, identifying four major clades. The large-flowered *C. striata* var. *striata* (northern U.S.A., southern Canada) was sister to the smaller-flowered var. *vreelandii* (southwestern U.S.A., Mexico), and the latter was sister to a Californian clade with relatively intermediate-sized flowers. *C. bentleyi* (eastern U.S.A.) shared a close relationship, sister to the remaining clades. A Principal Component Analysis and Nonparametric Multivariate Analysis of Variance on nine quantitative morphological characters and plastid DNA clades as independent variables, demonstrated strong correlations between morphological and genetic data.



Dryad and metadata research

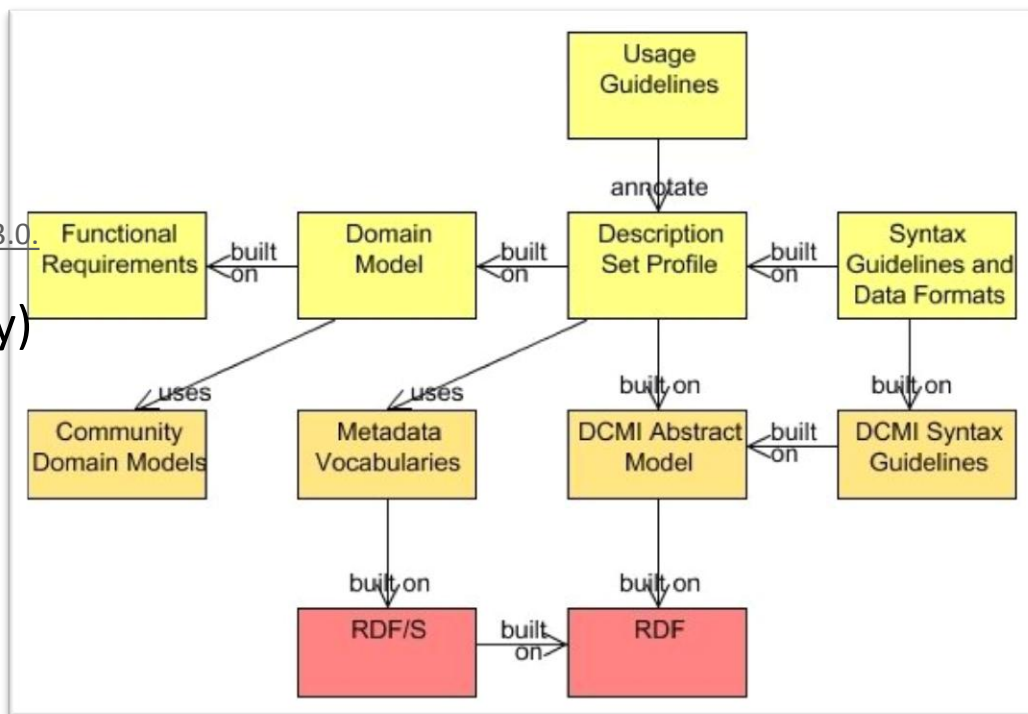
Metadata research & development

1. Curation workflow - **cognitive walkthroughs**
2. Dryad metadata scheme development - **crosswalk analyses**
(Dube, et al, 2007; Carrier, et al, 2007; White et al., 2008, Greenberg, et al, 2010; Greenberg 2009; 2010)
3. Metadata reuse - **content analysis** (Greenberg, IDCC Research Summit, 2010)
4. Instantiation - multi-method study (**comprehensions assessment**) (Greenberg, ASIST, 2009; RDAP, 2010)
5. Name-authority control - **exploratory study** (Haven, 2009, INLS 720)
6. KO/metadata community practices - Concurrent triangulation mixed methods (**survey + simulation experiment**) (White, 2010, ASIST, 2010 *JLM*)
7. Metadata functions - **quantitative categorical analysis** (Willis, Greenberg, and White, 2010, CODATA)
8. Vocabulary needs (**HIVE**) – **mapping study** (Greenberg, 2009, CCQ; Scherle, 2010, Code4Lib)
9. Metadata theory – **deductive analysis** (Greenberg, 2009)

Dryad DCAP (Dublin Core Application Profile), ver. 3.0

(<https://www.nescent.org/wg/dryad/images/8/8b/Dryad3.0.pdf>)

- **bibo** (The Bibliographic Ontology)
- **dcterms** (Dublin Core terms)
- **dryad** (Dryad) (property: Dryad**status**)
- **DwC** (Darwin Core)



Baker, T. (2007), Singapore Framework

Simple: automatic metadata gen;
heterogeneous datasets

Interoperable: harvesting, cross-system
searching

Semantic Web compatible: sustainable;
supporting machine processing

Data-package centric

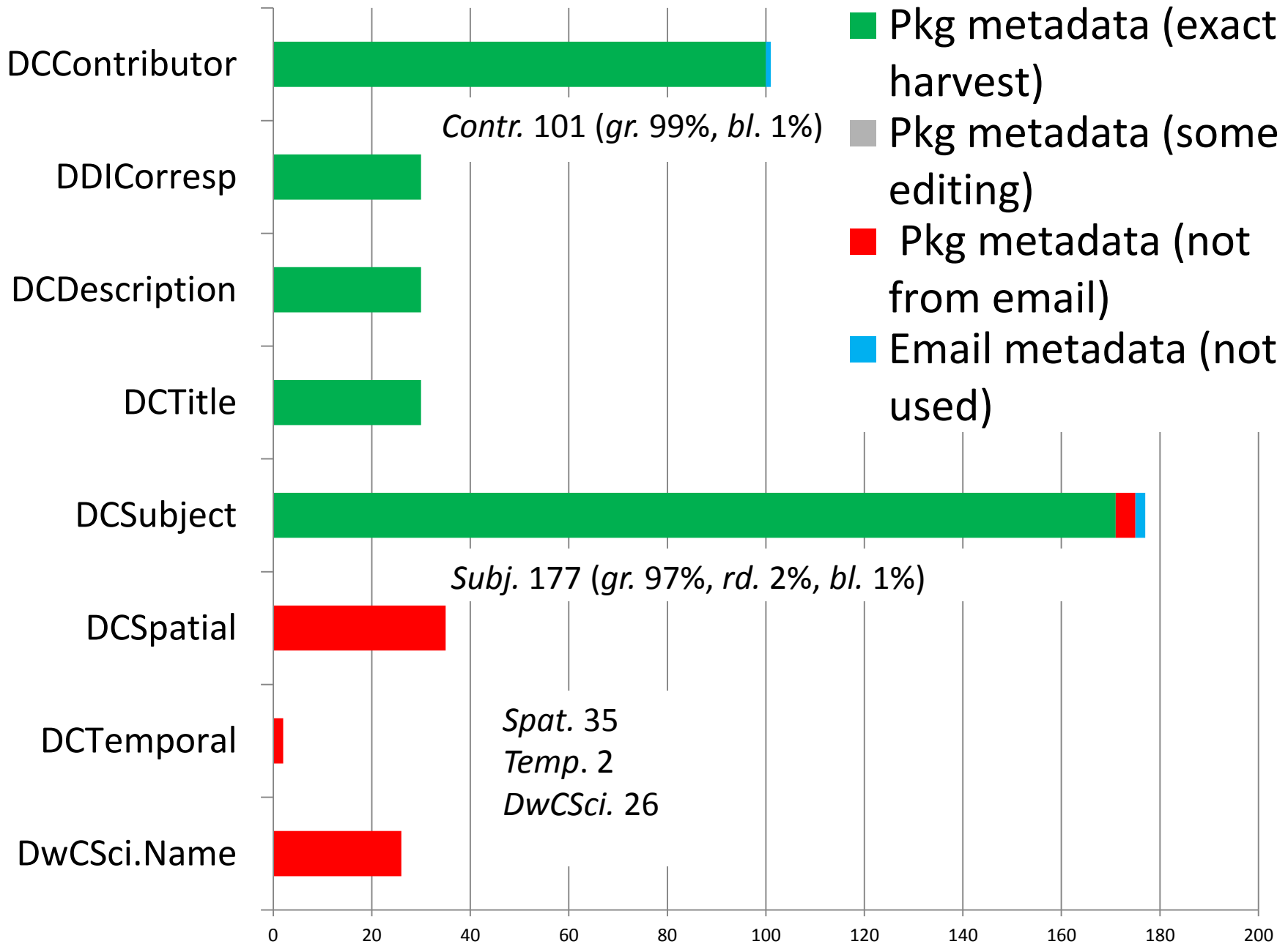
Next steps:

Alignment with Dryad-UK scheme
(Shotton, et al, 2011)

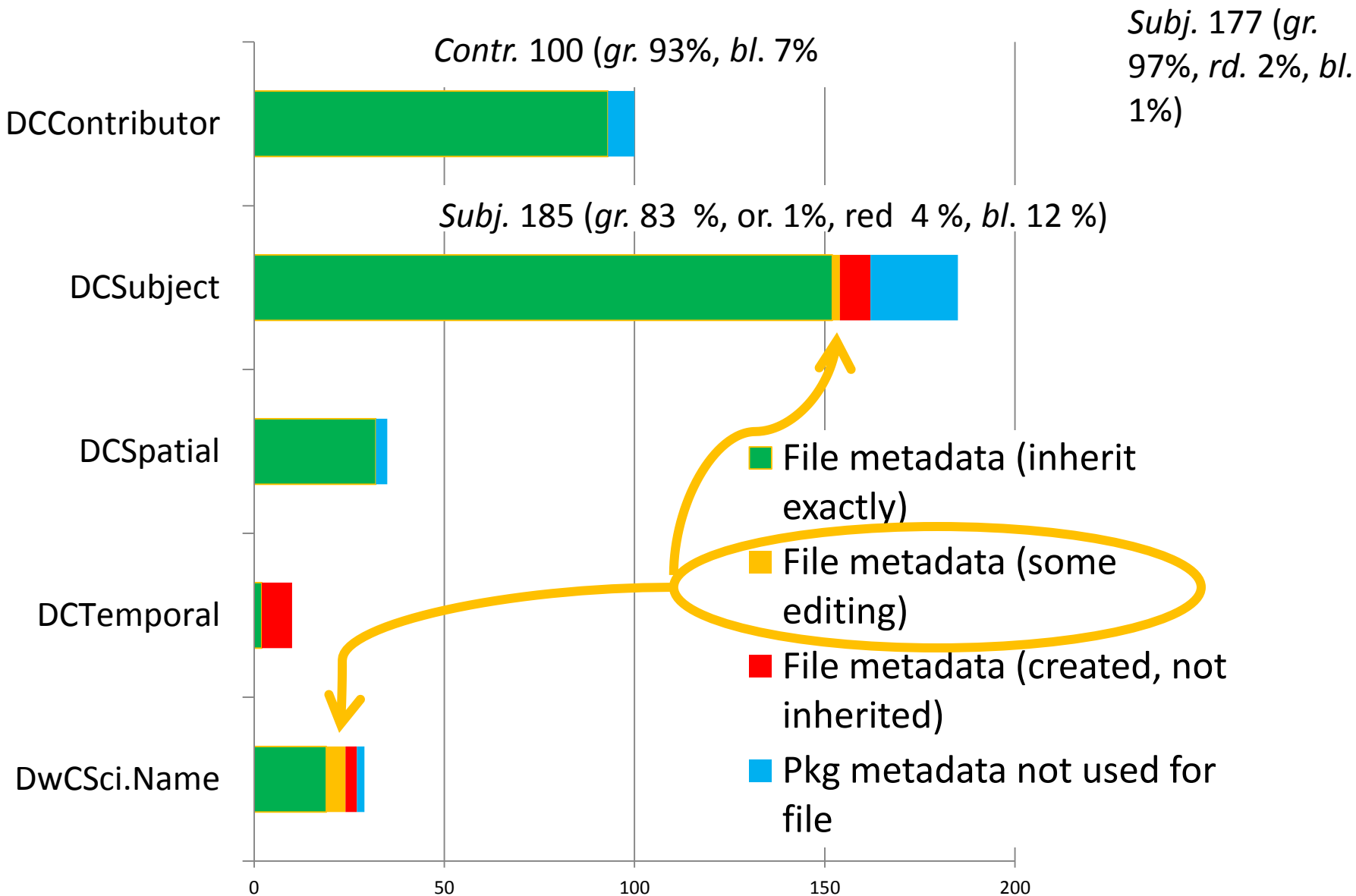
Map to DataCite:

Metadata reuse

Package metadata harvested from email



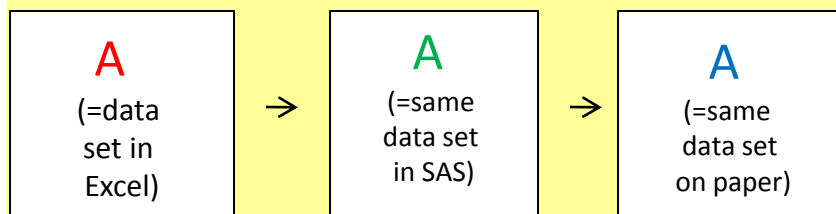
File metadata harvested from package metadata



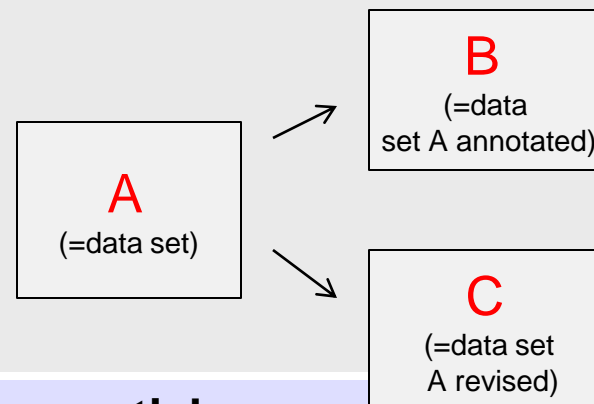
Instantiation

Data object relationships

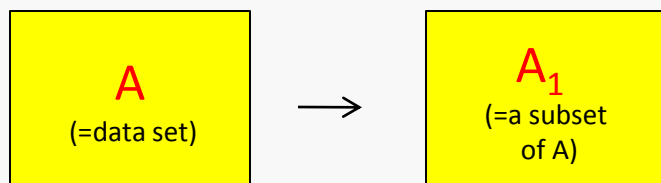
Equivalence



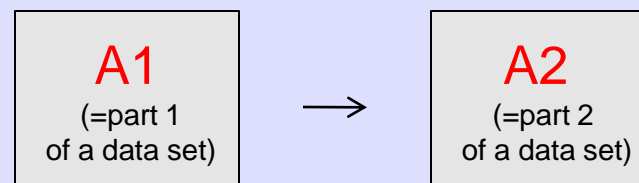
Derivative



Whole-part



Sequential



Instantiation; notion of “a work”

- *Bibliographic relationship* (Tillett, 1992, 1992; Smiraglia, 1999, 2000+.; Coleman, 2002)

Instantiation

Scenario: Sherry collects data on the survival and growth of the plant *Borrichia frutescens* (the bushy seaside tansy)... back at the lab she enters the exact same data into an excel spreadsheet and saves it on her hard drive.

Question: What is the relationship between Sherry's paper data sheet and her excel spreadsheet?

Answer: Equivalent | Derivative | Whole-part | Sequential
(circle one)

Findings (20 participants)

- ~ In general, more seasoned scientists better grasp these relationships
- ~ Sequential data presented some difficulty
- ~ Unanimous support: “very → extremely important”

Student projects, Name Authority Control



Automatic Metadata Generation R&D (SILS Metadata class)

This page was created in fall 2009 to document work done by students in Jane Greenberg's Metadata class in UNC SILS.

Final projects and independent study research

Dryad and HIVE: exploring automatic metadata generation and metadata quality.

1. **SNIP-IT project (Semantic Nuggets in Pieces of Indexed Text):** Article content and data object metadata generation—an evaluation of the suitability of published article content, found in pre and post data presentation sub-genres, for automatic metadata generation. (J. A. L. Skalla).
2. **NACS project (Name Authority Control for Scientists):** Name-authority control—an exploratory study on the need for name authority control for scientists depositing in Dryad, and the suitability of the LCNAF (LC Authorities: <http://authorities.loc.gov/>) (D. Haven)
3. **Comparing HIVE/HIVE and the NCBO Bioportal:** Comparing concept retrieval indexing and basic term matching techniques. (J. Sherman).
4. **HIVE Usability study:** Pilot testing HIVE interface and system in Hollie's 520 class, and preparing for more involved HIVE testing for masters's paper research. (L.Huang)
5. **MEOW[excel] project (MEtadata Object Wrapper):** Data object wrapper metadata—an *exploratory/very small scale* assessment of availability and quality of metadata associated excel data files stored in Dryad. (M.Graves)

12 Dryad journals, 188 author names, searched LC/NAF

- 20% established authorized headings
- 66% not in LC/NAF
- 14% inconclusive, due to foreign characters, initial for first names, and very common names.

KO/Metadata community practices:
Scientists and information professionals

KO/Metadata community practices: Scientists and information professionals

- Identify similarities and differences w/bioscience researchers (who use research data), and information professionals (who curate research data)
 - ~ Concurrent triangulation mixed methods:
 - Quasi-experiment simulating data integration into
 - PIM by scientists
 - Repository by information professionals
 - Metadata generation via Dryad
- Pilot work
 - ~ Librarians – create surrogates; keep original order; and use CVs
 - ~ Scientists – do not create metadata; arrange to suite research, and do not work w/CVs, although apply sci. names

(H. White, 2010)

(Center for Embedded Networked Sensing (CENS) repository project: Pepe, et al, *JASIST*, 2010; Wallis, et al, *IJDC*, 2008)

Metadata functions

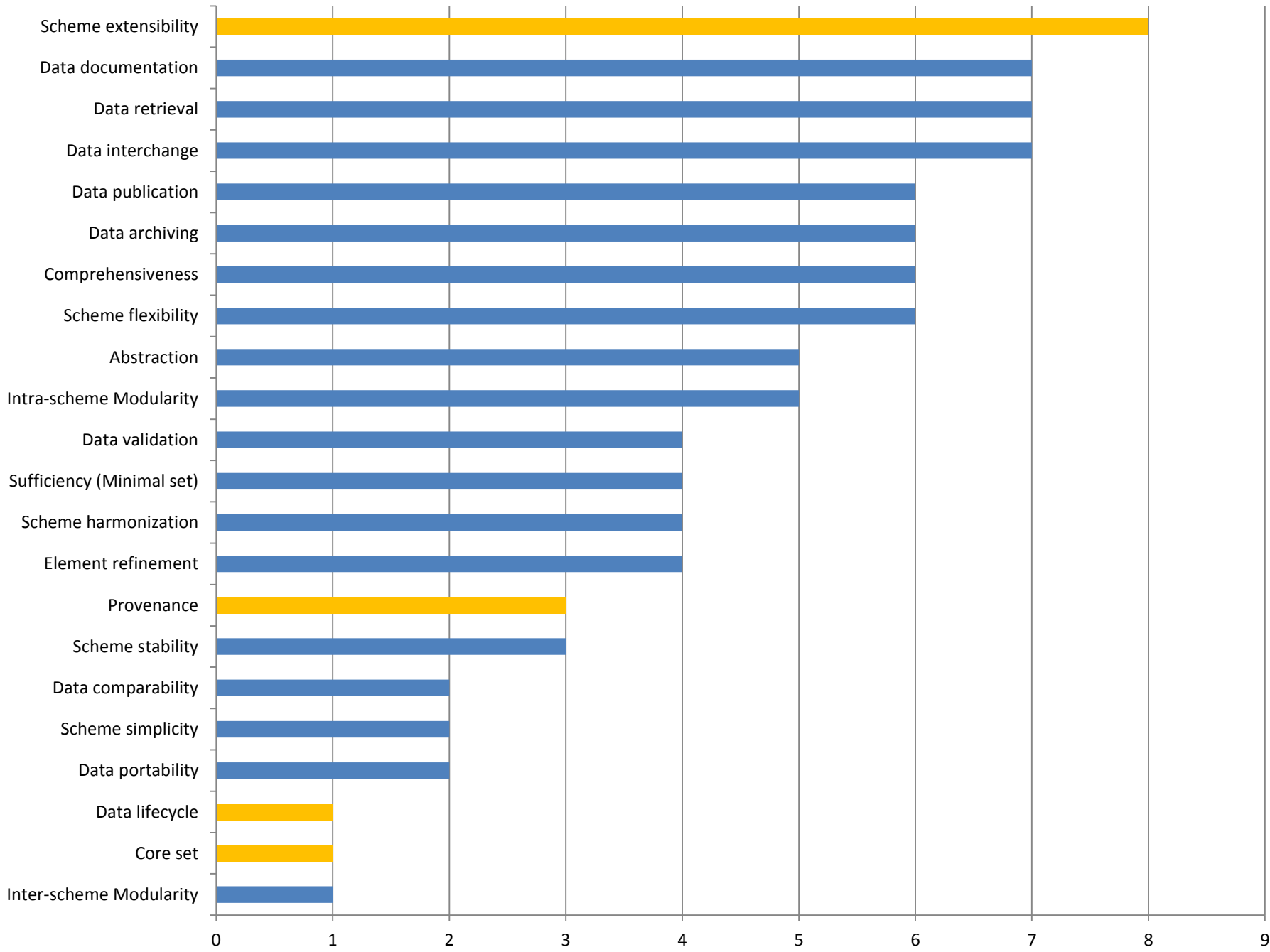
Functional aspects/properties

1. **Core set**
2. **Data lifecycle**
3. **Data portability**
4. Scheme simplicity
5. Data comparability
6. Scheme stability
7. **Provenance**
8. Element refinement
9. Scheme harmonization
10. Intra-scheme Modularity
11. Comprehensiveness
12. Data retrieval
13. Data documentation
14. Scheme extensibility

Criterion	Description
Core set	The scheme is intended to provide a common set of elements used to describe the most common situations.
Data lifecycle	The scheme is intended to support documentation of the data lifecycle.
Data portability	Data created intended to be "portable"...independent.

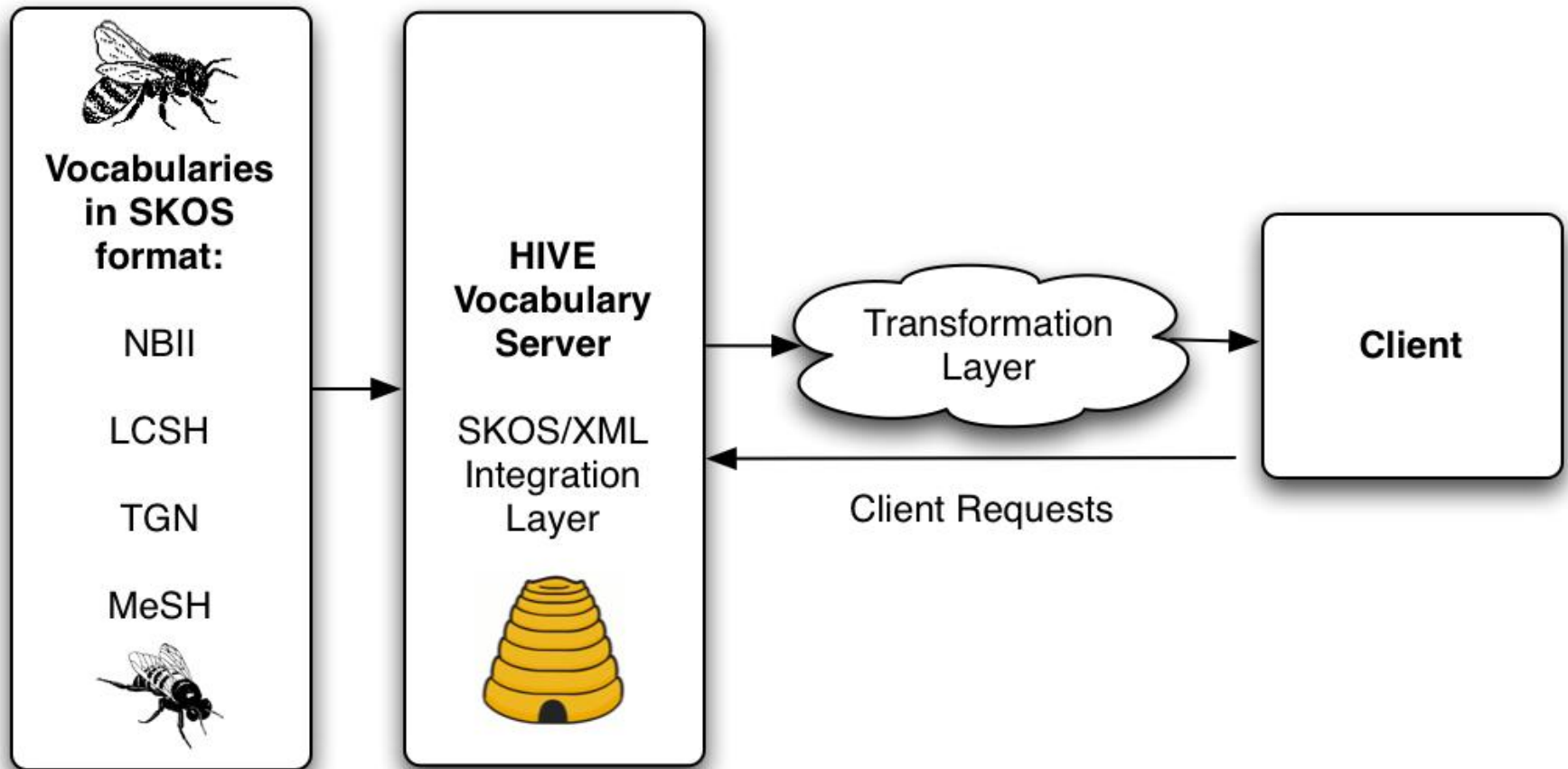
(Greenberg, 2005, MODAL (**Metadata Objectives and principles, Domains, and Architectural Layout) Framework, CCQ; Willis, Greenberg, & White, CODATA, 2010)**

Scheme	Vers.	Initial Rel.	Maint. Body	Repository
1. DDI	3.1	2000	DDI Alliance	ICPSR (and others)
2. CIF	2.4.1	1991	IUCr	Cambridge Structural Database (CSD)
3. DwC	App.P	2001	TDWG	GBIF
4. EML	2.1.0	1997	KNB	Ecological Archives
5. mmCIF	2.0.09	2005	wwPDB	Protein Data Bank (PDB)
6. MINiML	1.16	2007?	NCBI	Gene Expression Omnibus (GEO)
7. MAGE	1.0	2002	FGED	ArrayExpress
8. NEXML	1.0	2009	NESCent	TreeBase
9. ThermoML	3	2002	IUPAC	ThermoML Archives



HIVE – Helping Interdisciplinary Vocabulary Engineering

HIVE: Helping Interdisciplinary Vocabulary Engineering



- AMG approach for integrating discipline CVs
- Address CV cost, interoperability, and usability constraints
- Sample of 600 kw, topic, geo.name, research method... 18-25% matches

HIVE phases	Vocabulary partners	Workshop partners
<p>1. Building HIVE</p> <ul style="list-style-type: none"> ▪ Vocabulary preparation ▪ Server development <p>2. Sharing HIVE</p> <ul style="list-style-type: none"> ▪ Continuing education (empowering information professionals) <p>3. Evaluating HIVE</p>	<ul style="list-style-type: none"> ▪ Library of Congress - <i>LCSH</i> ▪ The Getty Research Institute - <i>Thesaurus of Geographic Names</i> ▪ United States Geological Survey - <i>NBII Thesaurus</i>, and <i>Integrated Taxonomic Information System</i> ▪ Agrovoc Thesaurus ▪ MeSH 	<p>Columbia Univ.; Univ. of California, San Diego; George Washington University; Univ. of North Texas; Universidad Carlos III de Madrid, Madrid, Spain</p> <p>Advisory Board</p> <p>Jim Balhoff, NESCent Libby Dechman, LCSH Mike Frame, USGS Alistair Miles, Oxford, UK William Moen, University of North Texas Eva Méndez Rodríguez, University Carlos III of Madrid Joseph Shubitowski, Getty Research Institute Ed Summers, LCSH Barbara Tillett, Library of Congress Kathy Wisser, Simmons Lisa Zolly, USGS</p>

Home

Concept Browser

Indexing

Opened vocabularies: AGROVOC LCSH MESH NBII TGN [+Add](#)

wood

Search

Your search for **wood** returns following concepts:

TGN Wood River
TGN Wood
TGN Wood
TGN Wood
TGN Wood
AGROVOC Reaction wood
LCSH Wood--Figure
LCSH Wood--Discoloration
AGROVOC Wood chips
AGROVOC Improved wood
LCSH Wood--Identification
LCSH Wood, Compressed
LCSH Compression wood
LCSH Wood distillation
LCSH Wood--Deterioration
LCSH Fireproofing of wood
LCSH Simulated wood

Filter the result

- TGN
- AGROVOC
- LCSH
- NBII

AGROVOC LCSH MESH NBII TGN

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
[0-9]

- ⊕ Additives
- ⊕ Administration
- ⊕ Africa
- ⊕ Agents
- ⊕ Aggregate data
- ⊕ Agricultural structure
- ⊕ Agroindustrial sector
- ⊕ Alcohols
- ⊕ Aldehydes
- ⊕ Alkaloids
- ⊕ Americas
- ⊕ Amides
- ⊕ Amino acids
- ⊕ Amino compounds
- ⊕ Ammonium compounds

LCSH->Wood--Discoloration

[View in SKOS](#)

Preferred Label	Wood--Discoloration
URI	http://id.loc.gov/authorities/sh98001746#concept
Alternative Label	Discoloration of wood; Wood discoloration;



Helping with **I**nterdisciplinary **V**ocabulary **E**ngineering

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HIVE Automatic Concepts Extractor

1 Select vocabulary source

Select

2 Upload a document

Choose File no file selected

Upload

OR Enter the URL

3

Start Processing

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Olena Medelyan
(olena@cs.waikato.ac.nz)



Meet Amy

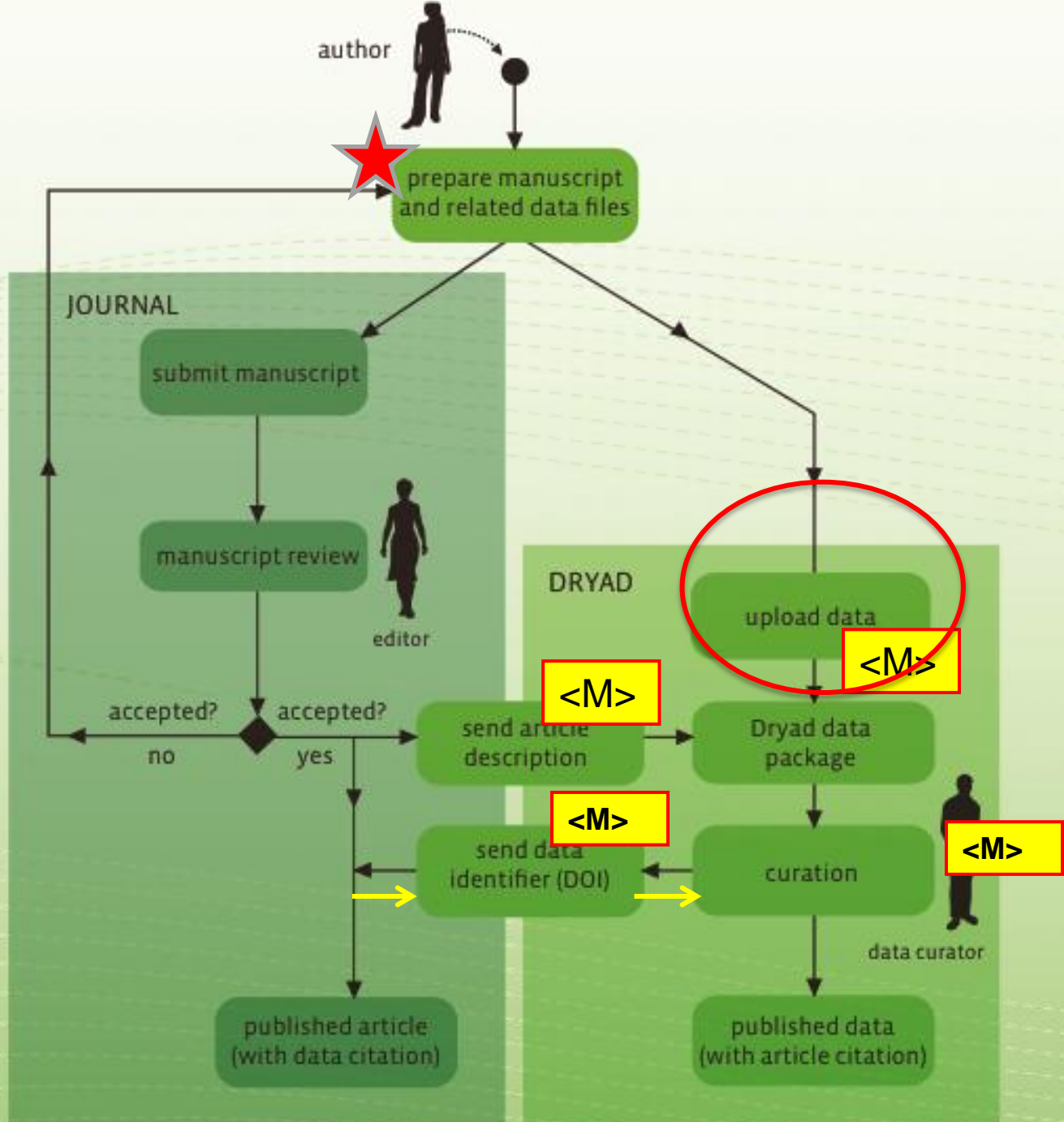
- Amy Zanne is a botanist.
- Like every good scientist, she publishes.

and...

- She deposits data in Dryad.



Family	Binomial	A (mm ²)	F (mm ² /mm ²)	N (mm ⁻²)	S (mm ⁴)
Caprifoliaceae	<i>Abelia biflora</i>	0.002375829	0.924197654	389.0	6.10753E-06
Caprifoliaceae	<i>Abelia dielsii</i>	0.00115375	0.357418211	331.0	3.48565E-06
Caprifoliaceae	<i>Abelia integrifolia</i>	0.001134115	0.240432369	212.0	5.3496E-06
Caprifoliaceae	<i>Abelia mosanensis</i>	0.000855299	0.632065665	739.0	1.15737E-06
Caprifoliaceae	<i>Abelia serrata</i>	0.000706858	0.206402637	292.0	2.42075E-06
Caprifoliaceae	<i>Abelia spathulata</i>	0.000804248	0.230819095	287.0	2.80226E-06
Malvaceae	<i>Abutilon fruticosum</i>	0.001452201	0.137959114	95.0	1.52863E-05
Malvaceae	<i>Abutilon pannosum</i>	0.003117245	0.124689812	40.0	7.79311E-05
Fabaceae	<i>Acacia albida</i>	0.012271846	0.049087385	4.0	0.003067962
Fabaceae	<i>Acacia ataxacantha</i>	0.013069811	0.169907541	13.0	0.00100537
Fabaceae	<i>Acacia borleae</i>	0.004071504	0.061072561	15.0	0.000271434
Fabaceae	<i>Acacia burkei</i>	0.008992024	0.053952141	6.0	0.001498671
Fabaceae	<i>Acacia caffra</i>	0.010207035	0.214347725	21.0	0.000486049
Fabaceae	<i>Acacia cyanophylla</i>	0.009160884	0.201539452	22.0	0.000416404
Fabaceae	<i>Acacia davyl</i>	0.008332289	0.099987469	12.0	0.000694357
Fabaceae	<i>Acacia erioloba</i>	0.015174678	0.091048067	6.0	0.002529113
Fabaceae	<i>Acacia erubescens</i>	0.008824734	0.07059787	8.0	0.001103092
Fabaceae	<i>Acacia exuvialis</i>	0.001134115	0.018145839	16.0	7.08822E-05
Fabaceae	<i>Acacia galpinii</i>	0.012076282	0.096610257	8.0	0.001509535
Fabaceae	<i>Acacia gerrardii</i>	0.011574413	0.098023581	7.5	0.001543255
Fabaceae	<i>Acacia grandicornuta</i>	0.006503882	0.045527175	7.0	0.000929126
Fabaceae	<i>Acacia haematoxylon</i>	0.005026548	0.095504417	19.0	0.000264555
Fabaceae	<i>Acacia hebeclada</i>	0.008659015	0.043295074	5.0	0.001731803
Fabaceae	<i>Acacia hereroensis</i>	0.003959192	0.047510306	12.0	0.000329933
Fabaceae	<i>Acacia karroo</i>	0.020867244	0.16693795	8.0	0.002608405
Fabaceae	<i>Acacia luederitzii</i>	0.007542964	0.105601495	14.0	0.000538783
Fabaceae	<i>Acacia manglum</i>	0.016933724	0.130928066	7.7	0.002208747
Fabaceae	<i>Acacia melanoxylon</i>	0.011976733	0.072419798	6.0	0.001996122
Fabaceae	<i>Acacia mellifera</i>	0.007697687	0.107767624	14.0	0.000549835
Fabaceae	<i>Acacia montis-ustl</i>	0.005410608	0.043284864	8.0	0.000676326
Fabaceae	<i>Acacia nebrownii</i>	0.002642079	0.039631191	15.0	0.000176139



**REVIEW AND
SYNTHESIS****Towards a worldwide wood economics spectrum**

Jerome Chave,^{1*} David Coomes,²
Steven Jansen,³ Simon L. Lewis,⁴
Nathan G. Swenson⁵ and Amy E.
Zanne^{6,7}

¹Laboratoire Evolution et
Diversité Biologique, UMR 5174,
CNRS/Université Paul Sabatier
Bâtiment 4R3 F-31062 Toulouse,
France

Abstract

Wood performs several essential functions in plants, including mechanically supporting aboveground tissue, storing water and other resources, and transporting sap. Woody tissues are likely to face physiological, structural and defensive trade-offs. How a plant optimizes among these competing functions can have major ecological implications, which have been under-appreciated by ecologists compared to the focus they have given to leaf function. To draw together our current understanding of wood function, we identify and collate data on the major wood functional traits, including the largest wood density database to date (8412 taxa), mechanical strength measures and anatomical



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HIVE Automatic Concepts Extractor

1 Select vocabulary source

Select

2 Upload a document

Choose File no file selected

Upload

OR Enter the URL

3

Start Processing

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REVIEW AND SYNTHESIS

Towards a worldwide wood economics spectrum

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Extracted Concepts Cloud

AGROVOC
LCSH
NBII

Reaction wood Wood--Figure Wood--Discoloration Calavicci, AI (Fictitious character) Lāt,
al- (Arabian deity) Murphy, AI (Fictitious character) Density Soils--Density Population
density Recessive traits Traits (genetics) Dominant traits Associated species Species
diversity Numbers of species Plant anatomy Plant litter Plant condition Leaf
spots Leaf prints Leaf blowers Brushes, Carbon Electrodes, Carbon Carbon
taxes Growth Fetus--Growth Growth (Plants) Infiltration water Water--
Color Drinking water

Who's using HIVE?

- NESCENT/Dryad
 - Evaluating HIVE for automatic term suggestion from multiple vocabularies for Dryad data package metadata.
- Long-Term Ecological Research Network (LTERNet)
 - <http://scoria.lternet.edu:8080/lter-hive-prototypes/>
 - Prototype application for automatic term suggestion for EML metadata files.
- Library of Congress Web Archives
 - Evaluating HIVE for automatic term suggestion for web archive (WARC) files

Many people and organizations to thank

Dryad Consortium Board, journal partners, and data authors:

NESCent: Kevin Clarke, Hilmar Lapp, Heather Piwowar, Peggy Schaeffer, Ryan Scherle

UNC-CH <Metadata Research Center>: Jose R. Pérez-Agüera, Sarah Carrier, Elena Feinstein, Lina Huang, Robert Losee, Hollie White, Craig Willis

U British Columbia: Michael Whitlock

NCSU Digital Libraries: Kristin Antelman

HIVE: Library of Congress, USGS, and The Getty Research Institute; and workshop hosts

Yale/TreeBASE: Youjun Guo, Bill Piel

DataONE: Rebecca Koskela, Bill Michener, Dave Veiglais, and many others

British Library: Lee-Ann Coleman, Adam Farquhar, Brian Hole

Oxford University: David Shotton



INSTITUTE of
Museum and Library
SERVICES



Concluding observations

Pros, Benefits

- Synergy between implementation and research
- MRC: Contributing to a project that will benefit science and society
- Broader familiarity / collective knowledge for problem solving
- A live lab, new research opportunities
- Intellectually exciting

Challenges

- Alignment of research and implementation goals (more immediate needs may not be the most interesting, vice/versa)
 - Priorities
- Infrastructure not there; planning for the future
- Language barriers
- Not having everyone in the same building

"Cherish old knowledge that you may acquire new"

The Analects of Confucius

<http://datadryad.org>

<http://blog.datadryad.org>

<http://datadryad.org/wiki>

<http://code.google.com/p/dryad>

dryad-users@nescent.org

Facebook: Dryad

Twitter: @datadryad

<http://ils.unc.edu/mrc/hive/>

<http://code.google.com/p/hive-mrc/>