

Import [include/exclude] Export

**using free systematic review
tool Rayyan for database
comparison study**

Introductions

Who Are We?

Stephanie Ritchie

University of Maryland

Agriculture and Natural Resources Librarian

Kelly Banyas

University of Scranton

Research & Instruction Librarian

Carol Sevin

Kansas State University

Academic Services Librarian – Science Team

Who Are You?

Instruction Librarian

Reference Librarian

Data Librarian

Subject Librarian

Collections Librarian

Systems Librarian

Assessment Librarian

Other

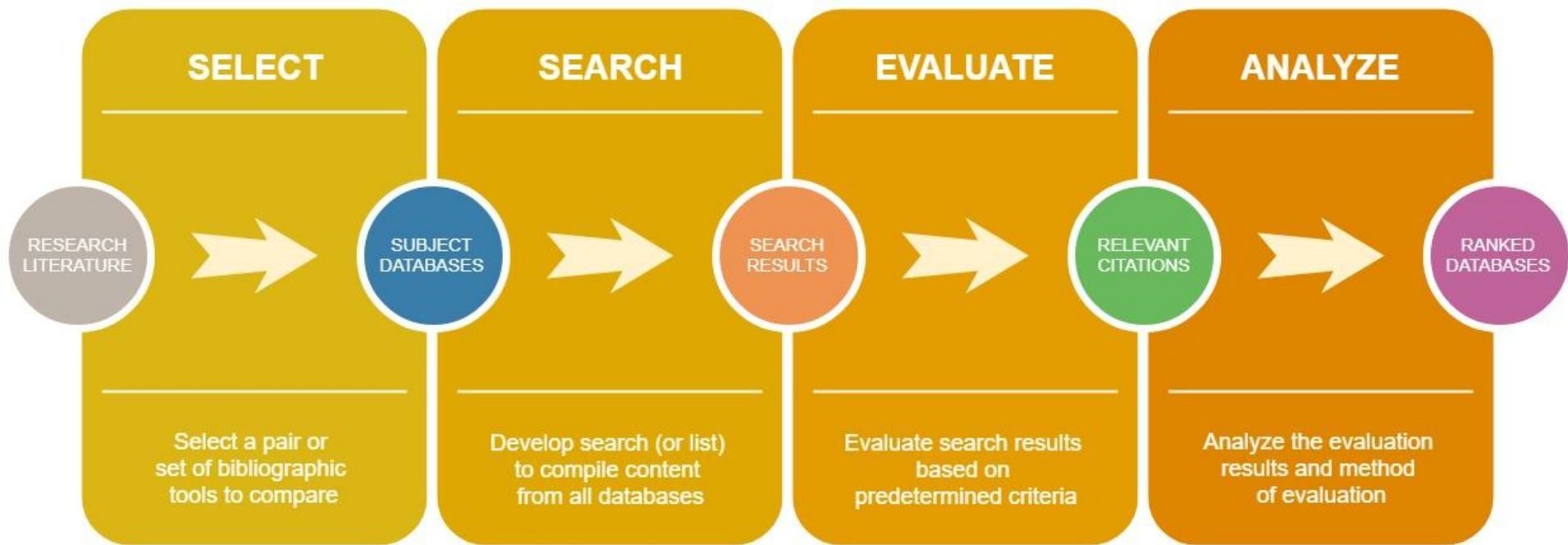
Database Comparison

What are we comparing?

The effectiveness of database search retrieval to meet an information need

Cranfield experiments pioneered evaluating information retrieval systems including bibliographic databases starting in the 1950s:

- selection of comparative strategies or systems
- creation of a ranked list or pool of experimental results
- determination of the relevancy of each item retrieved
- measurement of the effectiveness of each strategy or system
- ranking the strategies or systems relative to each other



Ritchie, Banyas, and Sevin, 2019

Study Background

Why did we do this study?

To compare search result retrieval across selected agricultural literature databases to inform:

- Collection Management Decisions
- Recommendations to Researchers
- Google Scholar



Study Background

Three Agricultural Topics

- Agronomy
- Meat Science
- Sustainable Diets

Part 1: Past Project

Searched **known items** (randomly selected citations from review articles)

Published – A Comparison of Selected Bibliographic Database Subject Overlap for Agricultural Information in *Issues in Science and Technology Librarianship* in Spring 2018

Eight Databases

AGRICOLA
AGRIS
BIOSIS
CAB
FSTA
Google Scholar
Scopus
Web of Science



Part 2: This Project

Reviewed **citations retrieved from searches** developed for same three agricultural topics in the same set of databases.

How to manage
the large volume
of data needed to
accurately assess
databases?

Methodology



Data Collection

- Three different topic searches in eight databases
- Try to capture 100 search results from each search for ~2400 data points

Data Review

- Use Rayyan to make relevancy decisions about each citation
- All three researchers review each citation in blind setting

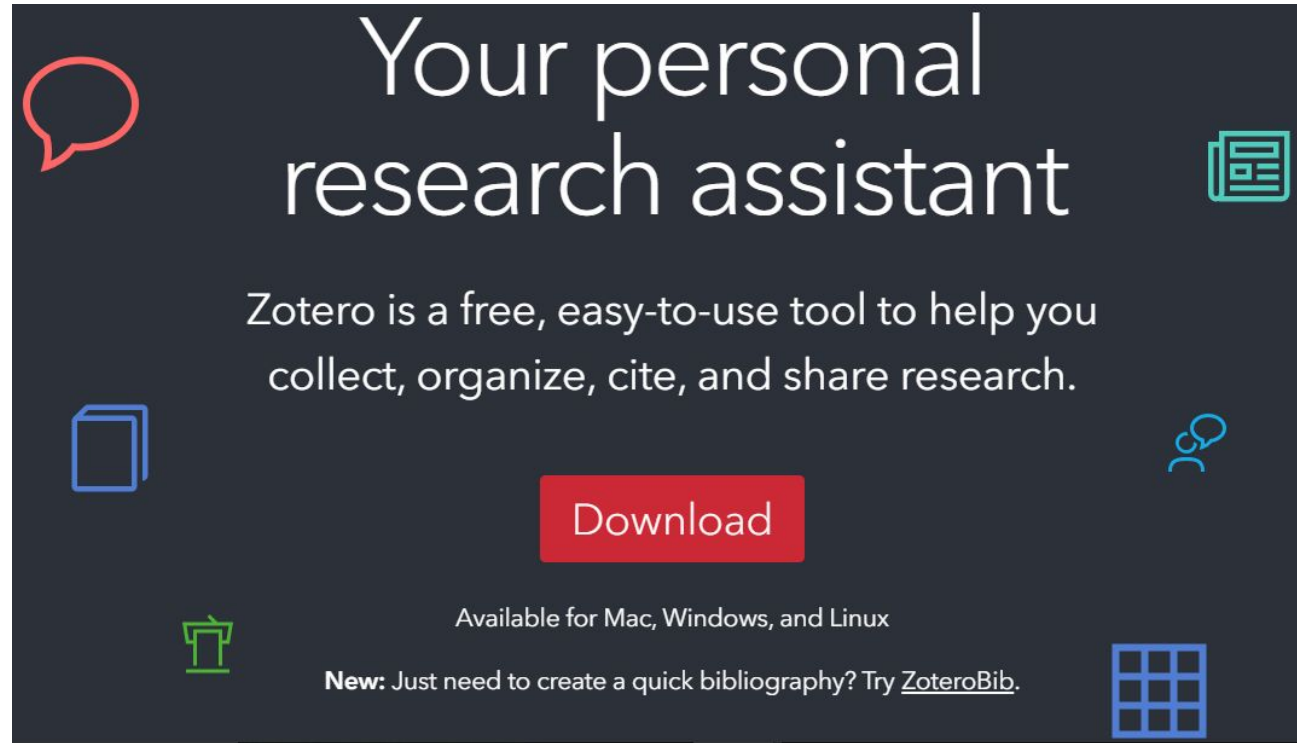
Data Analysis

- Spreadsheets and statistical analysis to reveal results and verify findings

The Process We Used to Collect Data

Data Collection Tools

- Zotero
 - CSV
- Excel



The Process We Used to Manage Data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Key	Item Type	Publication	Author	Title	Publication	ISBN	ISSN	DOI	Url	Abstract	Date	Date Added	Date Modified	Access Date	Pages	Num	Page Issue	Volume
2	J55RV3DT	JournalArt	2011	Riley, H.; EA UK publ	Nutrition Bulletin		1471-9827			http://sea	The main	1/1/2011	5/21/17 1	5/21/17 1		426-431		4	36
3	X8FTG122	JournalArt	2014	Allen, T.; P	Agricultur	Proceedings of the N	0029-6651			http://sea	The stark	1/1/2014	5/21/17 1	5/21/17 1		498-508		4	73
4	6JQXNBAI	JournalArt	2015	Luckett, B.	Applicatio	Public Health Nutriti	1368-9800			http://sea	Objective.	1/1/2015	5/21/17 1	5/21/17 1		2479-2487		13	18
5	789DSCZP	JournalArt	2015	Ruiter, H.	Assessing	Proceedings of the N	0029-6651			http://sea	In a globa	1/1/2015	5/21/17 1	5/21/17 1		E119-E119		OCE1	74
6	P22RCZS9	JournalArt	2012	Schosler, F	Can we cu	Appetite		0195-6663		http://sea	The shift t	1/1/2012	5/21/17 1	5/21/17 1		39-47		1	58
7	XUQH4AN	JournalArt	2015	Rieger, M.	Child heal	Economics & Human	1570-677X			http://sea	Child malr	1/1/2015	5/21/17 1	5/21/17 1		135-145			16
8	SD4BT6JW	JournalArt	2015	Hooijdonk	Dairy in a	Nutrition Reviews		0029-6643		http://sea	The dema	1/1/2015	5/21/17 1	5/21/17 1		48-54		Suppl. 1	73
9	F27U62T3	JournalArt	2013	Schonfeld	Dairy's rol	Bulletin of the Intern	0250-5118			http://sea	More than	1/1/2013	5/21/17 1	5/21/17 1		15-Nov		463	
10	IAMABJIJ	JournalArt	2007	Fairchild, I	Delivering	Public Health Nutriti	1368-9800			http://sea	There is a	1/1/2007	5/21/17 1	5/21/17 1		42-48		1	10
11	M2QQNM	JournalArt	2015	Holben, D	Developm	Journal of Hunger &	1932-0248			http://sea	The goal c	1/1/2015	5/21/17 1	5/21/17 1		293-296		2	10
12	AQUMAAI	JournalArt	2015	Felde, A. v	Developm	Cereal Technology	1869-2303			http://sea	Some 10 y	1/1/2015	5/21/17 1	5/21/17 1		88-95		No. 2	
13	REIV22UB	JournalArt	2015	Schutysen,	Dry fractic	Trends in Food Scien	0924-2244			http://sea	Plant prot	1/1/2015	5/21/17 1	5/21/17 1		327-335		2	45
14	3QH52GIT	JournalArt	2011	DeClerck,	Ecological	Food and Nutrition E	0379-5721			http://sea	Malnutriti	1/1/2011	5/21/17 1	5/21/17 1		41S-50S		1, Suppl.	32
15	9X9H5PNS	JournalArt	2015	Combris, F	Economic	Cahiers de Nutrition	0007-9960			http://sea	Economic	1/1/2015	5/21/17 1	5/21/17 1				6, Suppl. 1	50
16	TDTZB8FV	JournalArt	2011	Blasbalg,	Econutriti	Food and Nutrition E	0379-5721			http://sea	Macronut	1/1/2011	5/21/17 1	5/21/17 1		4S-13S		1, Suppl.	32
17	BNGKRM3	book	2012		Essentials of human		978-0-19-956634-1			http://sea	This textb	1/1/2012	5/21/17 1	5/21/17 1					
18	NXQ98K2I	JournalArt	2013	Carvalho,	Excessive	Public Health Nutriti	1368-9800			http://sea	Objective.	1/1/2013	5/21/17 1	5/21/17 1		1893-1899		10	16
19	BXV7MTQ	JournalArt	2014	Dooren, C	Exploring	Food Policy		0306-9192		http://sea	The objec	1/1/2014	5/21/17 1	5/21/17 1		36-46			44
20	NRWJT36I	JournalArt	2012	Karpinski,	Exploring	Journal of Nutrition I	1499-4046			http://sea	The purpo	1/1/2012	5/21/17 1	5/21/17 1		267-270		3	44
21	5TGSWBG	JournalArt	2014	Annunziat	Factors aff	Agricultural Economi	0139-570X			http://sea	Sustainabl	1/1/2014	5/21/17 1	5/21/17 1		353-363		8	60

The Process We Used to Review Data

Three groups of rabbits from the same genetic type were fed respectively with three experimental diets supplemented with 100 ppm of α -tocopherol and including a 3% of added fat: animal fat (A), sunflower oil (SF) or linseed oil (L). Fifty-two rabbits per group were used. Animals were slaughtered at 63 days of age. Live weight, dressing out percentage and carcass and meat quality traits were measured. A Bayesian analysis was performed. Animals fed with diet A showed higher live weight and higher carcass weight than animals fed with diets SF and L. SF and L animals had 96% and 95% of the LW that A group showed. The reference carcass in SF and L animals was 96% as heavy as in A animals. No differences were found between the SF and L animals for these traits; however, some differences appeared for dressing out percentage (DoP), having L animals higher DoP than SF (1% higher values). L animals also showed higher DoP than A animals, but the evidence of the differences was lower ($P \leq 0.03$). Nevertheless, the effect of dietary fat on these traits was small even if its presence can be detected. Animals fed with a diet enriched with animal fat showed higher lumbar circumference (around +3%), liver weight and carcass and retail cuts weights than animals fed with diets SF and L. No differences between SF and L animals were found for the main carcass traits except for meat to bone ratio (M/B). SF and A had higher M/B than L animals (5 and 3.4%, respectively). No diet effect was found for carcass fatness among the three groups of animals. Meat color was little affected by the diet. The evidence of a diet effect in redness was low. Carcass L^* was higher in A than in SF and L animals but differences were small (around 3%). The highest distance between diets appeared for yellowness (b^*). L animals showed lower carcass b^* values than SF and A animals. Carcasses from SF animals had 78% higher b^* values than carcasses from L animals, and carcasses from A animals showed double b^* values than carcasses from L animals. Regarding the fat color, fat from SF and L animals had 92% and 93% of the L^* values that A group showed, respectively. Fat yellowness was lower in A animals. SF and L had a 27% and 17% higher b^* fat values than A ($P \leq 0.01$). The evidence for the differences in fat b^* between SF and L was low. SF had a 16% higher meat b^* values than S. Effects on pH and moisture were not relevant. Diets enriched with n-3 and n-6 fatty acids have small effects on rabbit carcass characteristics. However, meat quality traits were not modified by the type of dietary fat.

I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
Document	ISBN	ISSN	Volume	Bulletin /	Page Num	Doi	Publisher	Place of P	Year of Pu	Location c	Country o	Languages	Notes	Kelly	Abstract Text			
Banff Pork Seminar Proceedings 2010					A26				2010	Edmonton	Canada	English		0				
Proceedings of the 9th World Rabbit Congress, Veron					1425-1430				2008	Castanet-Toulon	France	English		0	Three groups of rabbits from the			
South African Journal of Animal Production	0375-1584		45		3 229-233				2015	Hatfield	South Africa	English		1	Carcass classification is an essential			
South African Journal of Animal Production	0375-1584		45		3 339-354				2015	Hatfield	South Africa	English		1	The South African consumer market			
XXXIX Jornadas de Investigación en Producción Animal	97884613				613-615				2009	Zaragoza	Spain	Spanish		1	Worldwide, per capita consumption of			
Bulletin of University of Agriculture and Veterinary Medicine	1843-5262		72		1 81-84				2015	Cluj-Napoca	Romania	English		1	The quality of meat products from rabbits			

Rayyan QCRI

Rayyan is a 100% FREE web application to help systematic review authors perform their job in a quick, easy and enjoyable fashion. Authors create systematic reviews, collaborate on them, maintain them over time and get suggestions for article inclusion.

SIGN IN

GUEST ACCESS

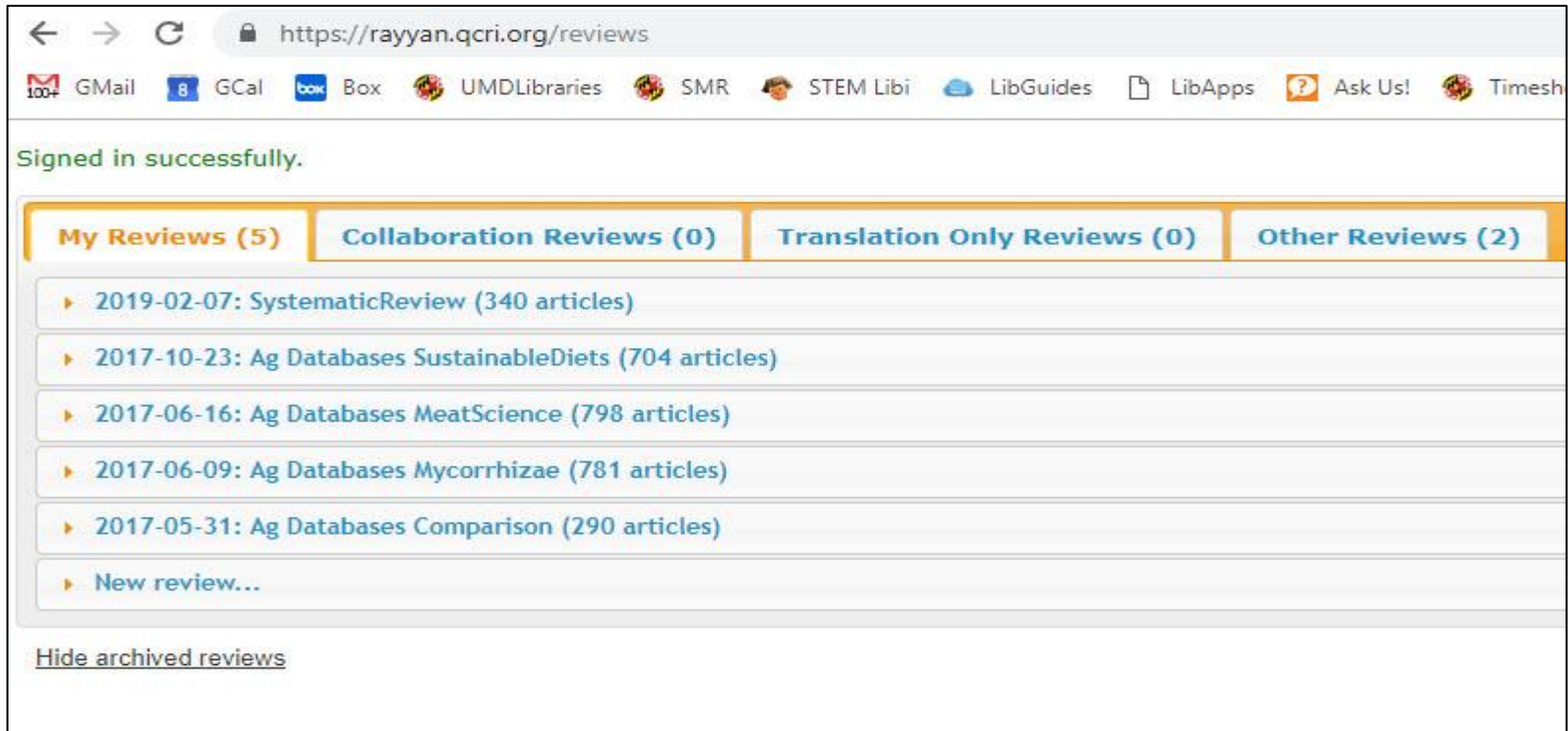
SIGN UP

Rayyan also has a mobile app. With this app, you can screen your reviews on the go such as while you are riding the bus. You can even use the app while offline; once connected, the app will automatically sync back to the Rayyan servers!



Data Review

What is Rayyan and how does it work?



The screenshot shows a web browser window with the URL <https://rayyan.qcri.org/reviews>. The browser's address bar and tabs are visible at the top. Below the browser window, a green message states "Signed in successfully." The main content area features a navigation bar with four tabs: "My Reviews (5)", "Collaboration Reviews (0)", "Translation Only Reviews (0)", and "Other Reviews (2)". The "My Reviews (5)" tab is selected, displaying a list of five reviews. Each review entry includes a date, a title, and the number of articles. The reviews are as follows:

Date	Review Title	Number of Articles
2019-02-07	SystematicReview	340
2017-10-23	Ag Databases SustainableDiets	704
2017-06-16	Ag Databases MeatScience	798
2017-06-09	Ag Databases Mycorrhizae	781
2017-05-31	Ag Databases Comparison	290

Below the list of reviews, there is a link labeled "New review...". At the bottom of the page, there is a link labeled "Hide archived reviews".

Data Review

Upload literature citation files in a variety of formats

New search for Review: SystematicReview

[List all](#)

Important: Note that every time you add a new search or delete one, all duplicate corrections you have made will be cleared

Upload References

Topic search

Select files...

Cancel

Continue

Migration Guides

Supported formats

Upload references in one of these text formats:

- EndNote Export ([download example.enw](#))
- Refman/RIS ([download example.ris](#))
- BibTeX ([download example.bib](#))
- CSV ([download example.csv](#))
- PubMed XML ([download example.xml](#))
- Web of Science/CIW ([download example.ciw](#))

Additionally, you can embed any of the above text files into:

- Text ([download example.txt](#))
- Microsoft Word ([download example.docx](#))
- GZ compressed file ([download example.ris.gz](#) or [evidencelive15.ris.gz](#))

Data Review

When analyzing the retrieved content, what were we looking for?

Agronomy:

“Review each item as a researcher interested in the interactions between mycorrhizae – especially arbuscular mycorrhizal fungi – and vegetable crops. Interactions with cereal or other field/agronomic crops are acceptable. Look for impacts and interaction mechanisms. Items definitely not of interest are things about mushroom or ornamental plant culture.”

Sustainable Diets: “Review each item as a researcher interested in diet and nutrition related to the environment or climate change. A few items have the word "sustainable/y" but they are not about environmental sustainability so exclude those items. Exclude articles on non-human diets and nutrition.”

Meat Science:

“Review each item as a researcher interested in meat quality as it impacts retail. These impacts can be on the display qualities, food safety traits, production systems, etc. as long as the article explicitly addresses both meat quality characteristics and retail. Retail can include retail display, marketing, consumer choices, etc. THE LINK TO RETAIL SHOULD BE CLEAR. For instance, articles that cover genomic traits that change meat quality characteristics commonly used to assess retail fitness would NOT be relevant. Articles that discuss customer response to different meat quality characteristics ARE relevant.”

Data Review

Duplicates

[Unresolved](#) 0

[Deleted](#) 0

[Not duplicates](#) 1

[Resolved](#) 1

Inclusion decisions

[Undecided](#) 91

[Included](#) 7

[Excluded](#) 2

Search methods [\[Add new\]](#)

[Uploaded References](#) [\[FSTA Mycorrhiz R...100\]](#)

Keywords for include [\[Add new\]](#)

[compared with](#) 12

[randomized](#) 4

[assigned to](#) 1

[randomised](#) 1

[randomly](#) 1

[trial](#) 1

Keywords for exclude [\[Add new\]](#)

[soil](#) 30

[in vitro](#) 5

[this review](#) 4

[animals](#) 2

[trials](#) 2

[literature review](#) 1

2017-05-31: Ag Databases Comparison **Blind ON**

Display mode

Export

Copy

New search

All reviews

Showing 2 to 7 of 100 unique entries

Search:

Date		Title	Rating
2011-01-01	Stephanie	Arbuscular mycorrhizal fungi (AMF) improved growth and nutritional quality of greenhou...	
2015-01-01	Stephanie	Arbuscular mycorrhizal fungi act as biostimulants in horticultural crops.	
2013-01-01	Stephanie	Arbuscular mycorrhizal fungi and plant growth-promoting pseudomonads increases anth...	
2004-01-01	Stephanie	passing mention of AMF Arsenic content of some edible mushroom species.	
2014-01-01	Stephanie	Beneficial mycorrhizal symbionts affecting the production of health-promoting phytoche...	

Include

Undecided

Exclude

Reason

Label

Highlights ON

Upload PDF full-texts

Arbuscular mycorrhizal fungi act as biostimulants in horticultural crops.

In the coming years, more sustainable horticultural practices should be developed to guarantee greater yield and yield stability, in order to meet the increasing food global demand. An environmentally-friendly way to achieve the former objectives is represented by the biostimulant functions displayed by arbuscular mycorrhizal fungi (AMF). AMF support plant nutrition by absorbing and translocating mineral nutrients beyond the depletion zones of plant rhizosphere (biofertilisers) and induce changes in secondary metabolism leading to improved nutraceutical compounds. In addition, AMF interfere with the phytohormone balance of host plants, thereby influencing plant development (bioregulators) and inducing tolerance to **soil** and environmental stresses (bioprotector). Maximum benefits from AMF activity will be achieved by adopting beneficial farming practices (e.g. reduction of chemical fertilisers and biocides), by inoculating efficient AMF strains and also by the appropriate selection of plant host/fung...

Stephanie

REVIEW CHAT

Data Review



The Process We Used to Analyze Data

The screenshot displays the Google Drive web interface. On the left, the 'My Drive' sidebar shows a folder structure: 'Team Drives' > 'Ag DB Comps Rese...' > 'Data' > 'Raw Data' > 'meat sci...'. The 'meat sci...' folder is selected. The main area shows a search bar and a breadcrumb path: 'Ag DB Comps Research > Data > Raw Data > meat science'. Below this is a table of files:

Name	Last modified	File size
meat AGRICOLA.csv	Mar 8, 2018 me	206 KB
meat AGRIS.csv	Mar 8, 2018 me	205 KB
meat BIOSIS.csv	Mar 8, 2018 me	211 KB
meat CAB.csv	Mar 8, 2018 me	185 KB
meat FSTA.csv	Mar 8, 2018 me	202 KB
meat GS.csv	Mar 8, 2018 me	164 KB
meat Scopus.csv	Mar 8, 2018 me	207 KB
meat WoS.csv	Mar 8, 2018 me	191 KB

On the right, the 'meat science' folder details are shown, including a 'Details' tab and a preview of the folder icon. At the bottom right, user avatars and a 'Google Drive Folde' label are visible.

The Process We Used to Analyze Data

[illegible]

RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>true}

Grebitus, http://dx.doi.org/10.4315/0362-028X.JFP-2011-001	Consumer	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>true}	RAYYAN-LABELS: y					
Tang, Xiac http://dx.doi.org/10.1016/j.foodcont.2011.05.011	Three me	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>true}	RAYYAN-LABELS: sensory,shelf life					
JuÃrez, N http://dx.doi.org/10.1016/j.meatsci.2011.05.011	In order to	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>true}	RAYYAN-LABELS: animal diet,sensory					
Thornton, http://dx.doi.org/10.2527/jas.2011-4678	A total of	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>false}						
Boselli, Er http://dx.doi.org/10.1002/ejlt.201100352	Cholester	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>true}						
Abdulmav http://dx.doi.org/10.1016/j.meatsci.2012.05.011	For specif	RAYYAN-INCLUSION: {"Stephanie"=>false, "kelly.banyas"=>false, "Carol"=>false}	RAYYAN-EXCLUSION-REASONS: Sexing					
KagambÃga, AssÃ and Martikainen, Ou and Liener	The study	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>false, "Carol"=>true}						
Rickard, J. http://dx.doi.org/10.1016/j.meatsci.2011.05.011	The objec	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>true}						
Kim, Yuan http://dx.doi.org/10.1016/j.meatsci.2011.05.011	The objec	RAYYAN-INCLUSION: {"Stephanie"=>true, "kelly.banyas"=>true, "Carol"=>false}	RAYYAN-LABELS: MAP					

The Process We Used to Analyze Data

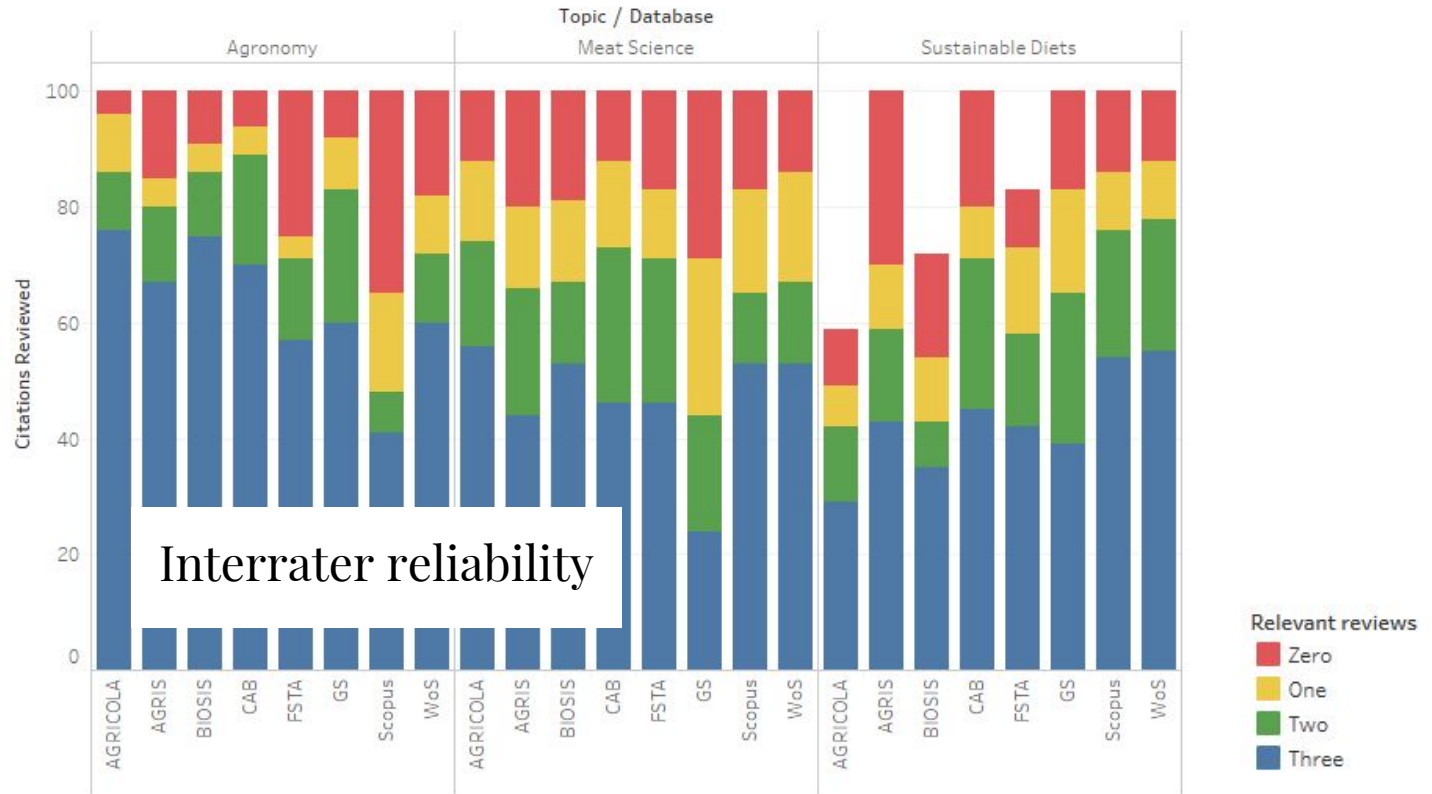
Tabulate data for precision, recall, and uniqueness

title	year	journal	issn	volume	issue	pages	url	abstract	notes	authors	"Stephanie"	"kelly.bany"	"Carol"=>t	average	unique	unique and	dups
The effect of retail pack	2015	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2015.05.011	This study	RAYYA Geesink		1	1	1	1	0	0	7
Effects of dietary potato	2015	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2015.05.012	We hypoth	RAYYA Thornto		1	1	1	1	0	0	6
Effects of heme and non	2015	Journal of food measurement & characterization					http://dx.doi.org/10.1016/j.jfme.2015.05.013	Iron is kno	RAYYA Purohit		1	1	1	1	0	0	6
Meat quality and health	2015	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2015.05.014	Recommen	RAYYA Kamihir		1	1	1	1	0	0	7
Myofibril Fragmentation	2015	Journal of	1458892				http://dx.doi.org/10.1016/j.jfme.2015.05.015	A study wa	RAYYA Rajagop		1	1	1	1	0	0	5

			- 0921-4488 (Print)														
			- 0921-4488 (Linking)														
Chevon quality enhance	2014	Small rum					http://dx.doi.org/10.1016/j.meatsci.2014.05.016	Goat meat	RAYYA Kannan		1	1	1	1	0	0	5
Growth, carcass traits a	2014	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2014.05.017	It is well k	RAYYA Brito, G		0	0	0	0	0	0	6
Heritability of muscle sc	2014	Animal prc	1836-093				http://dx.doi.org/10.1016/j.animal.2014.05.018	To assess t	RAYYA Robinsc		0	0	0	0	0	0	6
Shelf life of meat from l	2014	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2014.05.019	The use of	RAYYA OrtuÃ±		1	1	1	1	0	0	6
Fresh Meat Packaging: C	2013	Journal of	0362-028X				http://dx.doi.org/10.1016/j.meatsci.2013.05.020	Consumer	RAYYA Grebitu		1	1	1	1	0	0	7
Predicting shelf-life of cl	2013	Food control					http://dx.doi.org/10.1016/j.foodcon.2013.05.021	Three met	RAYYA Tang, Xi		1	1	1	1	0	0	2
Beef quality attributes a	2012	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2012.05.022	In order to	RAYYA JuÃ¡rez		1	1	1	1	0	0	6
Bovine sire selection ba	2012	Journal of	1525-3163				http://dx.doi.org/10.1016/j.meatsci.2012.05.023	A total of 4	RAYYA Thornto		1	1	0	0.6666666	0	0	6
Cholesterol photosensit	2012	European	1438-7697				http://dx.doi.org/10.1016/j.meatsci.2012.05.024	Cholesterc	RAYYA Boselli,		1	1	1	1	1	1	1
Determination of pig se	2012	Meat scier	1873-4138				http://dx.doi.org/10.1016/j.meatsci.2012.05.025	For specifi	RAYYA Abdulm		0	0	0	0	0	0	5
Diarrheagenic Escherich	2012	Internatio	1879-3460				http://dx.doi.org/10.1016/j.meatsci.2012.05.026	The study	RAYYA Kagamk		1	0	1	0.6666666	1	0.6666666	1

An example of the raw data used to tabulate database effectiveness

The Process We Used to Analyze Data



The Process We Used to Analyze Data

Why include statistical analysis?

What can statistical analysis show you?

SPSS vs. R

	A	B	C	D
1	Relevance	Database	Subject	Reviewer
2	0	AGRICOLA	sustainable_diets	1
3	1	AGRICOLA	sustainable_diets	1
4	1	AGRICOLA	sustainable_diets	1
5	0	AGRICOLA	sustainable_diets	1
6	1	AGRICOLA	sustainable_diets	1
7	1	AGRICOLA	sustainable_diets	1
8	1	AGRICOLA	sustainable_diets	1
9	0	AGRICOLA	sustainable_diets	1
10	1	AGRICOLA	sustainable_diets	1
11	0	AGRICOLA	sustainable_diets	1
12	1	AGRICOLA	sustainable_diets	1
13	1	AGRICOLA	sustainable_diets	1
14	0	AGRICOLA	sustainable_diets	1
15	0	AGRICOLA	sustainable_diets	1
16	1	AGRICOLA	sustainable_diets	1
17	0	AGRICOLA	sustainable_diets	1

Lessons Learned

Data Collection

- So many variations in databases evaluation process/metrics exist that you need to determine what will result in data you need to make decision
- Different platforms led to different searching experiences
- Zotero

Data Review

- Find tools that can help you manage large sets of data and data review
- Takes much longer than you think it will take

Data Analysis

- Talk to a statistician or other expert

Further Reading

Clough P, Sanderson M. 2013. Evaluating the performance of information retrieval systems using test collections. *Information Research*. 18(2). Paper 582. <http://www.informationr.net/ir/18-2/paper582.html>

McHugh, ML. 2012. Interrater reliability: the kappa statistic. *Biochemia Medica*, 22(3):276–282. <https://www.biochemia-medica.com/en/journal/22/3/10.11613/BM.2012.031>

Ritchie SM, Young L, Sigman J. 2018. A Comparison of Selected Bibliographic Database Subject Overlap for Agricultural Information. *Issues in Science and Technology Librarianship*. (Spring). <http://www.istl.org/18-spring/refereed2.html>

Thank You!

Stephanie Ritchie
sritchie@umd.edu

Kelly Banyas
kelly.banyas@scranton.edu

Carol Sevin
sevin@ksu.edu