

Summer 2009

Journals Not Included in BIOSIS Have a Notable Impact in Biology

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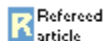
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Recommended Citation

Claudia Lascar and Philip Barnett. Journals Not Included in BIOSIS Have a Notable Impact in Biology. *Issues in Science & Technology Librarianship* Number 58, (Summer 2009). <http://www.istl.org/09-summer/refereed2.html>

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Journals Not Included in BIOSIS Previews Have a Notable Impact in Biology

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Abstract

The purpose of this study was to reveal influential journals used by life scientists; journals not currently included in *BIOSIS Previews*, but included in either *PubMed* or *Science Citation Index Expanded*. These 252 journals were revealed by the Eigenfactor, an iterative ranking scheme which quantitatively measures the scientific influence of academic publications based upon their usage by scholars. This method has allowed us to determine which journals not covered by *BIOSIS Previews* have a notable impact in biology. Such an analysis is important for individual scientists, libraries, professional societies and funding organizations. This analysis illustrates the benefit of searching multiple databases for more accurate article retrieval in biology.

Introduction

When researchers need to obtain all the primary journal literature on a topic, how often do end-user scientists or their mediators need to supplement a *Chemical Abstracts* search for chemistry, an *INSPEC* search for physics, or a *BIOSIS Previews* search for biology? Even though chemistry, physics, and biology have these large, well-established databases, do researchers in these fields truly have access to the most extensive coverage of journal literature in these disciplines? To begin to answer this question, we examined the current journal coverage in one of these venerable

databases, *BIOSIS Previews*, to determine whether researchers in biological sciences have access to the most extensive coverage of journal literature through this abstracting index.

The *BIOSIS Previews* database started as *BA-Previews* in 1969 and changed to its current name in 1975. It monitors more than 5,000 journals, as well as non-journal literature such as books, symposia, meeting abstracts, software, and patents ([Thomson Reuters 2006](#); [2009a](#); [2009b](#)). The history and development of this product and its producer has been described by Freedman ([1995](#)). Thomson Reuters took ownership of *BIOSIS Previews* in 2004.

Thomson Reuters describes the subject scope of *BIOSIS Previews* in their fact sheets and product description ([Thomson Reuters 2006](#); [2009a](#); [2009b](#)) as providing "information in virtually every life sciences discipline, including traditional biology (botany, ecology, zoology), interdisciplinary subjects (biochemistry, biomedicine, and biotechnology), and related areas such as instrumentation and methods" ([Thomson Reuters 2009a](#)). Their source coverage policy states that, "Publications must be peer-reviewed, and the editors and editorial boards must be representative of the publication's subject area. The journal's editorial roster must also display diversity of institutional affiliation and geographic base. Furthermore, it is important that the source be regular in its publication schedule and that its contents are timely" ([Ten Have 2006](#)).

Specific subjects included in *BIOSIS Previews* are zoology, microbiology, and botany, as well as interdisciplinary and applied areas such as agriculture, biomedicine, biochemistry, pharmacology, veterinary science, and biotechnology. Furthermore, journals in disciplines that are closely aligned with biology are monitored. These disciplines include geology, energy, hydrology, oceanography, forestry, chemistry, and physics. Excluded are journals focusing on the more applied aspects of human life sciences, such as patient care, nursing, health care and hospital administration, medical education, legal medicine, medical practice, and technique such as surgical journals. *BIOSIS Previews* does not cover journals that emphasize clinical practice, such as the practice of medicine, patient care, practice-related techniques, or allied health-related titles, unless the journal focus is on research ([Ten Have 2006](#)). Even with these considerations and limitations in mind, Thomson Reuters does add journals to *BIOSIS Previews*. For example, 168 titles were added during the year ending in September 2005 ([Fitzgerald 2005](#)).

Several previous studies have compared the subject coverage of *BIOSIS Previews* with other databases. In each of these studies, the investigators performed specific subject searches both in *BIOSIS Previews* and other biologically oriented databases to compare the respective retrievals. These comparisons include, marine biology ([Markham & Huber 2005](#)), a single genus ([Jones 2005](#)), entropy in evolution ([Fedunok 2005](#)), ecology and ecosystem management ([Haas et al. 1999](#)), a specific search within alternative medicine ([Snow 1998](#)), clinical medicine ([Brandsma et al. 1990](#)), alternatives to animal testing ([Snow 1990](#)), human nutrition ([Nixon 1989](#)), four vitamins ([Kusama & Koremura 1988](#)), agriculture and forestry ([Brooks 1980](#)), and poison control ([Lorent 1979](#)).

While these studies showed the relative strength, weaknesses, and degree of unique coverage of *BIOSIS Previews* compared to some of its competitors, their subject specificity prevents them from fully answering the question of how extensively it currently covers the research literature in the life sciences.

We intend to address a different aspect of this many-faceted question by determining whether important journals in the life sciences not currently covered in *BIOSIS Previews*, are covered by two databases not entirely biologically oriented, *MEDLINE* and *Science Citation Index Expanded*.

Methods

Over the last fifty years the Impact Factor has become a measure of journals' relative importance in the fields of science, with implications for grants, tenure and hiring decisions. Eugene Garfield, Founder and Chairman Emeritus of the Institute for Scientific Information -- now Thomson Reuters -- introduced in 1955 the idea of the Impact Factor as a bibliographical tool for *Science Citation Index* ([Garfield 2006](#)). Impact Factor is the mean number of citations to articles published in a journal over a two-year period. This tool has been criticized as having several weaknesses, such as its inability to assess the citation quality, inclusion of self-citations in the analysis, and the poor comparability between different scientific fields ([Cameron 2005](#)). These limitations of the Impact Factor and advances in computational mathematics/information retrieval have prompted many researchers recently to find alternatives ([Banks & Dellavalle 2008](#)). The new instruments include the h-index ([Hirsch 2005](#)); Strike Rate Index ([Barendse 2007](#)); Y-factor, ([Bollen et al. 2006](#)); Eigenfactor ([Bergstrom 2007](#)); MESUR ([Bollen et al. 2008](#)); and SCImago ([Falagas et al. 2008](#)).

To define and identify journals not currently covered by *BIOSIS Previews*, we have chosen to use the Eigenfactor, developed by Carl T. Bergstrom at the University of Washington and described in detail at {<http://www.eigenfactor.org/methods.php>}. The Eigenfactor uses Thomson Reuters data, but ranks journals according to an iterative ranking scheme similar to that used by Google's PageRank algorithm. The concept is not new. In 1976, Pinski and Narin are credited with developing the algorithm for calculating influence weights of citing articles based on the number of times that they had been cited ([Pinski & Narin 1976](#)). Brin and Page ([1998](#)) have applied the notion of weighting hyperlinks in their PageRank algorithm used to calculate the importance of web pages used by Google search engine.

The Eigenfactor score does not measure the quality of the journal based entirely on the simple citation counts as provided by the Impact Factor, instead it takes into account "the scientific influence of a journal on the scholarly literature or, comparably, the total value provided by all of the articles published in that journal in a year" ([Bergstrom 2007](#)). As a consequence, this tool makes a definite distinction between prestigious journals, such as *Nature*, and obscure publications within a particular discipline ([Bergstrom et al. 2008](#)). The Eigenfactor algorithm takes a random journal and follows a random citation in that journal to another journal, then selects another random citation from the second journal and follows that to the next journal, and so on. By using the whole citation network, the algorithm accounts for differences in the publication patterns of different disciplines and sub-disciplines ([Bergstrom et al. 2008](#)).

[Eigenfactor.org](#) is an open-access resource, while the Thomson Reuters *Journal Citation Reports* (JCR), the source of the Impact Factor data, requires a paid subscription. This web site displays the Eigenfactor score for each of the journals listed in the 2006 JCR. If a journal doubles in size while the quality of its articles remains constant, we would expect its Eigenfactor score to double, since its total importance to the scientific community has doubled.

We chose to compare *BIOSIS Previews* to *MEDLINE* and to *Science Citation Index Expanded*. We chose *MEDLINE* because its *PubMed* version is free, it covers a large portion of the life sciences (Bianchi 2002), and it is widely used (Herskovic et al. 2007). We picked *Science Citation Index Expanded*, the most current version of the venerable *Science Citation Index*, because it is obviously selective. *Science Citation Index Expanded* which is part of the *Web of Science* "overcomes information overload and focuses on essential data from over 6,650 of the world's leading scientific and technical journals across 150 disciplines" (Thomson Reuters 2009d). The lists of journals currently covered in these three databases are freely available on the World Wide Web and updated frequently: *BIOSIS Previews* (Thomson Reuters 2009c), *Science Citation Index Expanded* (Thomson Reuters 2009e), and *PubMed* (National Library of Medicine 2009).

We first compared the entire *BIOSIS Previews* list of journals (total journals 4,653) to a control list of 2,609 life sciences journals. This control list consists of journals ranked by the Eigenfactor score within the 2006 JCR subject categories covered by *BIOSIS Previews* (Table 1). 2006 is the latest year for which the Eigenfactor data are available. Titles in this control list not currently indexed by *BIOSIS Previews* were then checked to see whether they were included in *PubMed* (which indexes 5,246 journals) and in *Science Citation Index Expanded* (which indexes 7,907 journals). Only journals indexed by *PubMed* or *Science Citation Index Expanded*, but not *BIOSIS Previews* are listed in Table 2a and Table 2b.

Table 1. The JCR Subject Categories Analyzed

The numbers in parentheses are the numbers of journals in each JCR Subject Category for 2006 at: <http://www.eigenfactor.org/>

Agriculture, Dairy & Animal Science (47)	Forestry (37)
Agriculture, Multidisciplinary (31)	Genetics & Heredity (133)
Agriculture, Soil Science (29)	Horticulture (105)
Agronomy (52)	Limnology (100)
Anatomy & Morphology (18)	Marine & Freshwater Biology (85)
Biochemical Research Methods (57)	Microbiology (91)
Biochemistry & Molecular Biology (270)	Mycology (17)
Biodiversity Conservation (26)	Oceanography (131)
Biology (68)	Ornithology (19)
Biophysics (69)	Paleontology (37)
Biotechnology & Applied Microbiology (144)	Parasitology (23)
Cell Biology (163)	Physiology (82)
Developmental Biology (34)	Plant Sciences (155)
Ecology (118)	Reproductive Biology (24)
Entomology (71)	Veterinary Sciences (149)
Evolutionary Biology (37)	Virology (23)
Fisheries (43)	Zoology (121)

We used the sort feature of MS Word to alphabetize the journal lists, then stripped the extraneous data using the software's basic edit commands. By assigning a different font color to each of the lists, we easily were able to identify the unique journal titles in each database.

Each control list title not covered in *BIOSIS Previews* was checked in *WorldCat* for possible title changes. Only those titles included in either *PubMed*, *Science Citation Index Expanded*, or both of these databases were kept for further analysis.

Results

256 titles from the control list are not indexed by *BIOSIS Previews* but are indexed by either *PubMed* or *Science Citation Index Expanded* or both.

To ensure that each of these titles is currently being indexed in *PubMed* and *Science Citation Index Expanded*, searches were performed on each title to see if current articles from these journals were actually included in these databases. Only four of these titles did not have recent coverage. These titles with their corresponding JCR category are:

1. *Advances in veterinary medicine* (Veterinary Sciences). While this title appears on the list of current List of Journals Indexed for MEDLINE, the 1999 issue appears to be the last one published.
2. *Journal of biochemistry and molecular biology* (Biochemistry & Molecular Biology). While this title appears on the current List of Journals Indexed for MEDLINE, the most recent paper included in *PubMed* is over a year old (November 2007). The Journals Database at pubmed.gov indicates that this journal is not currently indexed in MEDLINE.
3. *SMPTE motion imaging journal* (Horticulture, Limnology, Oceanography). While the web site for this journal posts its current issue, the latest issue covered by *Science Citation Index Expanded* is over a year old.
4. *Solid State Physics* (Horticulture, Limnology, Oceanography). 2006 is the latest date included in *Science Citation Index Expanded*.

Table 2a lists the 252 journals currently indexed by *PubMed* (92 titles) or *Science Citation Index Expanded* (239 titles) arranged according to their JCR subject categories. The four titles which do not have current coverage are excluded. The Eigenfactor Scores of these 252 journals indicate that they are needed by practicing biologists because they are cited often by other influential journals.

51 of these titles can be found in *Zoological Record*, currently published by Thomson Scientific, formerly BIOSIS and the Zoological Society of London until 2004.

Many journals belong to more than one subject category, as indicated in Table 2b. The scope of these journals illustrates the multidisciplinary nature of biology and its relationship to apparently unrelated fields. Many of the journals which fall concomitantly under the three subjects -- horticulture, limnology, and oceanography -- illustrate this characteristic. They are included because their Eigenfactor score identifies them as significant within these subject categories.

Table 2a. Eigenfactor list of biology journals not currently indexed by *BIOSIS Previews* but indexed by *PubMed* or *Science Citation Index Expanded*

Agriculture, Dairy & Animal Science

	PubMed	Science Citation Index Expanded
Journal of applied poultry research		Yes
Rangeland ecology & management ^{ZR}		Yes
Agriculture, Multidisciplinary		
	PubMed	Science Citation Index Expanded
Agricultural history		Yes
Agriculture and human values		Yes
Journal of agriculture and rural development in the tropics and subtropics		Yes
Journal of agriculture of the University of Puerto Rico ^{ZR}		Yes
Journal of sustainable agriculture		Yes
Landbauforschung Völkenrode		Yes
Pesquisa agropecuária brasileira ^{ZR}		Yes
Philippine agricultural scientist		Yes
Renewable agriculture and food systems		Yes
Scientia agricola		Yes
Agronomy		
	PubMed	Science Citation Index Expanded
Alleopathy journal		Yes
Industrial crops and products		Yes
International sugar journal		Yes
Irrigation and drainage		Yes
Postharvest biology and technology		Yes
Anatomy & Morphology		
	PubMed	Science Citation Index Expanded
Anatomical record		Yes
Clinical anatomy	Yes	Yes
Microscopy research and technique		Yes
Surgical and radiologic anatomy	Yes	Yes
Biochemical Research Methods		
	PubMed	Science Citation Index Expanded
Chromatographia		Yes

IEEE transactions on nanobioscience	Yes	Yes
Journal of fluorescence	Yes ^(S)	Yes
Journal of magnetic resonance	Yes ^(S)	Yes
Biochemistry & Molecular Biology		
	PubMed	Science Citation Index Expanded
Amyloid	Yes	Yes
Biochemistry and molecular biology education		Yes
Bioinorganic chemistry and applications		Yes
Cell communication & adhesion	Yes	Yes
Chemistry & biodiversity	Yes	Yes
Journal of food biochemistry		Yes
Journal of molecular modeling	Yes	Yes
Macromolecular bioscience	Yes	Yes
Molecular interventions	Yes	Yes
Natural product reports	Yes	Yes
Pteridines		Yes
Seikagaku. The Journal of Japanese Biochemical Society	Yes	
Trends in glycoscience and glycotecchnology		Yes
Biodiversity Conservation		
	PubMed	Science Citation Index Expanded
Global change biology ^{ZR}		Yes
Biology		
	PubMed	Science Citation Index Expanded
American biology teacher		Yes
Microscopy research and technique	Yes	Yes
Rivista di biologia	Yes	Yes
Biology		
	PubMed	Science Citation Index Expanded
Microscopy research and technique		Yes
Biophysics		
	PubMed	Science Citation Index Expanded
	Yes	Yes

Colloids and surfaces. B, Biointerfaces		
High altitude medicine & biology	Yes	Yes
Journal of biomechanical engineering	Yes	Yes
NMR in biomedicine	Yes	Yes
Physica medica	Yes	Yes
Pteridines		Yes
Biotechnology & Applied Microbiology		
	PubMed	Science Citation Index Expanded
Agrofoodindustry hi-tech		Yes
Biofutur		Yes
Biopharm international		Yes
Biotechnology law report		Yes
Chimica oggi: Chemistry today		Yes
Current nanoscience		Yes
Current opinion in molecular therapeutics	Yes	Yes
Expert opinion on biological therapy	Yes	Yes
Food and bioproducts processing		Yes
Genetic engineering & biotechnology news		Yes
Journal of food safety		Yes
Journal of rapid methods and automation in microbiology		Yes
Metabolic engineering	Yes	Yes
Minerva biotecnologica		Yes
Molecular therapy	Yes	Yes
Nanomedicine (London, England)	Yes	Yes
Nature reviews. Drug discovery	Yes	Yes
New genetics and society		Yes
Plant biotechnology journal	Yes	Yes
Cell Biology		
	PubMed	Science Citation Index Expanded
Acta histochemica	Yes	Yes
Aging cell	Yes	Yes
Cell communication & adhesion	Yes	Yes
Cytopathology	Yes	Yes
Endothelium: journal of endothelial cell research	Yes	Yes

Traffic (Copenhagen, Denmark)	Yes	Yes
Developmental Biology		
	PubMed	Science Citation Index Expanded
Evolution & development ^{ZR}	Yes	Yes
Ecology		
	PubMed	Science Citation Index Expanded
Frontiers in ecology and the environment ^{ZR}		Yes
Global change biology ^{ZR}		Yes
Journal of soil and water conservation		Yes
Rangeland ecology & management ^{ZR}		Yes
Rangeland journal		Yes
Revue d'écologie: la terre et la vie ^{ZR}		Yes
Entomology		
	PubMed	Science Citation Index Expanded
Agricultural and forest entomology ^{ZR}		Yes
American bee journal		Yes
Deutsche entomologische Zeitschrift ^{ZR}		Yes
Sociobiology ^{ZR}		Yes
Evolutionary Biology		
	PubMed	Science Citation Index Expanded
Anthropological science ^{ZR}		Yes
Evolution & development ^{ZR}	Yes	Yes
Fisheries		
	PubMed	Science Citation Index Expanded
Bulletin of the European Association of Fish Pathologists ^{ZR}		Yes
California cooperative oceanic fisheries investigations reports ^{ZR}		Yes
CCAMLR science ^{ZR}		Yes
Forestry		
	PubMed	Science Citation Index Expanded
Allgemeine Forst und Jagdzeitung		Yes
European journal of forest research		Yes

Forest products journal		Yes
Forestry chronicle ^{ZR}		Yes
Holzforschung		Yes
International forestry review		Yes
Wood and fiber science		Yes
Wood science and technology		Yes
Genetics & Heredity		
	PubMed	Science Citation Index Expanded
Clinical dysmorphology	Yes	Yes
Community genetics	Yes	Yes
Evolution & development ^{ZR}	Yes	Yes
Genetic engineering & biotechnology news		Yes
Molecular diagnosis & therapy	Yes	Yes
Molecular therapy	Yes	Yes
New genetics and society		Yes
Prenatal diagnosis	Yes	Yes
Twin research and human genetics	Yes	Yes
Horticulture		
	PubMed	Science Citation Index Expanded
Advances in enzymology and related areas of molecular biology	Yes	
American journal of health behavior	Yes	
Annual review of nuclear and particle science		Yes
Arkivoc		Yes
Astronomy reports		Yes
Bulletin of experimental biology and medicine		Yes
Chemical communications	Yes ^(S)	Yes
CIRP annals: manufacturing technology		Yes
Comptes rendus Geoscience ^{ZR}		Yes
EDN		Yes
Food and drug law journal	Yes	Yes
Hastings Center report	Yes	Yes
IEEE transactions on aerospace and electronic systems		Yes
IEEE transactions on information theory		Yes
Il nuovo cimento della Società Italiana di Fisica B		Yes

Journal of asthma	Yes	Yes
Journal of personality assessment	Yes	
Journal of sedimentary research		Yes
Journal of the American Podiatric Medical Association	Yes	Yes
Journal of the Professional Association for Cactus Development		Yes
Journal of universal computer science		Yes
Journal of vacuum science & technology B		Yes
Nursing education perspectives	Yes	
Ophthalmic genetics	Yes	Yes
Otolaryngology--head and neck surgery	Yes	Yes
Management science		Yes
Polymer science. Series C		Yes
Postharvest biology and technology		Yes
Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen		Yes
Radiation measurements		Yes
Radiation physics and chemistry		Yes
Research quarterly for exercise and sport	Yes	Yes
Reviews in analytical chemistry		Yes
Revue d'écologie : la terre et la vie ^{ZR}		Yes
Russian journal of general chemistry		Yes
Separation science and technology		Yes
SIAM journal on control and optimization		Yes
Sub-cellular biochemistry	Yes	
Limnology		
	PubMed	Science Citation Index Expanded
Advances in enzymology and related areas of molecular biology	Yes	
American journal of health behavior	Yes	
Annual review of nuclear and particle science		Yes
Arkivoc		Yes
Astronomy reports		Yes
Chemical communications	Yes ^(S)	Yes
CIRP annals: manufacturing technology		Yes
Bulletin of experimental biology and medicine		Yes
Comptes rendus Geoscience ^{ZR}		Yes
EDN		Yes

Food and drug law journal	Yes	Yes
Hastings Center report	Yes	Yes
IEEE transactions on aerospace and electronic systems		Yes
IEEE transactions on information theory		Yes
Il nuovo cimento della Società Italiana di Fisica B		Yes
Journal of asthma	Yes	Yes
Journal of personality assessment	Yes	
Journal of sedimentary research		Yes
Journal of the American Podiatric Medical Association	Yes	Yes
Journal of the Professional Association for Cactus Development		Yes
Journal of universal computer science		Yes
Journal of vacuum science & technology B		Yes
Management science		Yes
Nursing education perspectives	Yes	
Ophthalmic genetics	Yes	Yes
Otolaryngology--head and neck surgery	Yes	Yes
Polymer science. Series C		Yes
Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen		Yes
Radiation measurements		Yes
Radiation physics and chemistry		Yes
Research quarterly for exercise and sport	Yes	Yes
Reviews in analytical chemistry		Yes
Revue d'écologie : la terre et la vie ^{ZR}		Yes
Russian journal of general chemistry		Yes
Separation science and technology		Yes
SIAM journal on control and optimization		Yes
Sub-cellular biochemistry	Yes	
Water and environment journal ^{ZR}		Yes
Water resources research		Yes
Marine & Freshwater Biology		
	PubMed	Science Citation Index Expanded
Bulletin of the European Association of Fish Pathologists ^{ZR}		Yes
International review of hydrobiology ^{ZR}		Yes
Journal of marine systems ^{ZR}		Yes
Microbiology		

	PubMed	Science Citation Index Expanded
Clinical microbiology and infection	Yes	Yes
Enfermedades infecciosas y microbiología clínica	Yes	Yes
Environmental microbiology ^{ZR}	Yes	Yes
European journal of clinical microbiology & infectious diseases	Yes	Yes
Journal of clinical microbiology ^{ZR}	Yes	Yes
Reviews in medical microbiology		Yes
Oceanography		
	PubMed	Science Citation Index Expanded
Acta oceanologica Sinica ^{ZR}		Yes
Advances in enzymology and related areas of molecular biology	Yes	
American journal of health behavior	Yes	
Annual review of nuclear and particle science		Yes
Applied ocean research		Yes
Arkivoc		Yes
Astronomy reports		Yes
Atmosphere-ocean		Yes
Bulletin of experimental biology and medicine		Yes
Chemical communications	Yes ^(S)	Yes
CIRP annals: manufacturing technology		Yes
Comptes rendus Geoscience ^{ZR}		Yes
Continental shelf research ^{ZR}		Yes
Deep-sea research. Part II, Topical studies in oceanography ^{ZR}		Yes
Dynamics of atmospheres and oceans		Yes
EDN		Yes
Environmental fluid mechanics		Yes
Food and drug law journal	Yes	Yes
Geo-marine letters		Yes
Hastings Center report	Yes	Yes
IEEE journal of oceanic engineering		Yes
IEEE transactions on aerospace and electronic systems		Yes
IEEE transactions on information theory		Yes
Il nuovo cimento della Società Italiana di Fisica B		Yes
Izvestiya Atmospheric and oceanic physics		Yes

Journal of asthma	Yes	Yes
Journal of marine systems ^{ZR}		Yes
Journal of navigation		Yes
Journal of oceanography ^{ZR}		Yes
Journal of personality assessment	Yes	
Journal of physical oceanography		Yes
Journal of sedimentary research		Yes
Journal of the American Podiatric Medical Association	Yes	Yes
Journal of the Professional Association for Cactus Development		Yes
Journal of universal computer science		Yes
Journal of vacuum science & technology B		Yes
Management science		Yes
Marine geology		Yes
Marine geophysical researches		Yes
Marine technology and SNAME news		Yes
Marine Technology Society journal ^{ZR}		Yes
Naval engineers journal		Yes
Nursing education perspectives	Yes	
Ocean & coastal management ^{ZR}		Yes
Ocean dynamics		Yes
Ocean engineering		Yes
Ocean modelling		Yes
Oceanologia ^{ZR}		Yes
Ophthalmic genetics	Yes	Yes
Otolaryngology--head and neck surgery	Yes	Yes
Paleoceanography ^{ZR}		Yes
Polymer science. Series C		Yes
Progress in oceanography ^{ZR}		Yes
Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen		Yes
Radiation measurements		Yes
Radiation physics and chemistry		Yes
Research quarterly for exercise and sport	Yes	Yes
Reviews in analytical chemistry		Yes
Revue d'écologie : la terre et la vie ^{ZR}		Yes
Russian journal of general chemistry		Yes
Separation science and technology		Yes

SIAM journal on control and optimization		Yes
Sub-cellular biochemistry	Yes	
TAO: Terrestrial, atmospheric, and oceanic sciences		Yes
Tellus. Series A, Dynamic meteorology and oceanography		Yes
Ornithology		
	PubMed	Science Citation Index Expanded
Ardeola ^{ZR}		Yes
Paleontology		
	PubMed	Science Citation Index Expanded
Comptes rendus Palevol ^{ZR}		Yes
GFF ^{ZR}		Yes
Journal of micropalaeontology ^{ZR}		Yes
Journal of quaternary science		Yes
Neues Jahrbuch für Geologie und Paläontologie. Abhandlungen ^{ZR}		Yes
Paleoceanography ^{ZR}		Yes
Proceedings of the Geologists' Association ^{ZR}		Yes
Stratigraphy and geological correlation		Yes
Parasitology		
	PubMed	Science Citation Index Expanded
Malaria journal ^{ZR}	Yes	Yes
Physiology		
	PubMed	Science Citation Index Expanded
Advances in physiology education	Yes	Yes
Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme	Yes	Yes
Chemical senses ^{ZR}	Yes	Yes
Clinical journal of sport medicine	Yes	Yes
Hypertension in pregnancy	Yes	Yes
Journal of electromyography and kinesiology	Yes	Yes
Journal of mammary gland biology and neoplasia	Yes	Yes
Journal of physiology and pharmacology	Yes	Yes
Klinische Neurophysiologie		Yes
Pediatric exercise science	Yes	Yes

Stress (Amsterdam, Netherlands)	Yes	Yes
Plant Sciences		
	PubMed	Science Citation Index Expanded
Journal of Asian natural products research	Yes	Yes
Journal of bryology		Yes
Journal of natural products ^{ZR}	Yes	Yes
Plant biotechnology journal	Yes	Yes
Reproductive Biology		
	PubMed	Science Citation Index Expanded
European journal of obstetrics, gynecology, and reproductive biology	Yes	Yes
Reproductive biomedicine online	Yes	
Twin research and human genetics	Yes	Yes
Veterinary Sciences		
	PubMed	Science Citation Index Expanded
Acta veterinaria Scandinavica	Yes	Yes
Anthrozoos		Yes
Archivos de medicina veterinaria ^{ZR}		Yes
Australian veterinary practitioner.		Yes
Bulletin of the Veterinary Institute in Pulawy		Yes
Canadian Association of Radiologists journal = Journal l'Association canadienne des radiologistes	Yes	Yes
Canadian veterinary journal. La revue veterinaire canadienne	Yes	Yes
Cattle practice		Yes
COMPEL: the international journal for computation & mathematics in electrical & electronic engineering		Yes
Compendium	Yes	Yes
Equine veterinary education		Yes
In practice		Yes
Ippologia		Yes
Irish veterinary journal		Yes
Journal of avian medicine and surgery ^{ZR}	Yes	Yes
Journal of camel practice and research		Yes
Journal of equine veterinary science		Yes
Journal of exotic pet medicine ^{ZR}		Yes

Journal of feline medicine and surgery	Yes	Yes
Journal of swine health and production		Yes
Journal of the American Veterinary Medical Association	Yes	
Journal of veterinary dentistry	Yes	Yes
Journal of veterinary diagnostic investigation ^{ZR}	Yes	Yes
Journal of veterinary emergency and critical care		Yes
Journal of veterinary medical education	Yes	Yes
Kleintier-Praxis		Yes
Lab animal	Yes	Yes
New Zealand veterinary journal ^{ZR}	Yes	Yes
Philosophical magazine		Yes
Pferdeheilkunde		Yes
Praktische Tierarzt		Yes
Precision engineering		Yes
Point vétérinaire		Yes
Proceedings of the Institution of Mechanical Engineers. Part L, Journal of materials, design and applications		Yes
Revista Científica de la Facultad de Ciencias Veterinarias		Yes
Revue de médecine vétérinaire		Yes
Society & animals ^{ZR}		Yes
Tieraerztliche Praxis. Ausgabe G, Grosstiere/Nutztiere ^{ZR}		Yes
Turkish journal of veterinary & animal sciences		Yes
Veterinární medicína ^{ZR}		Yes
Veterinary anaesthesia and analgesia	Yes	Yes
Veterinary and comparative orthopaedics and traumatology: V.C.O.T	Yes	Yes
Veterinary clinics of North America. Equine practice	Yes	Yes
Veterinary dermatology	Yes	Yes
Veterinary medicine		Yes
Veterinary pathology ^{ZR}	Yes	Yes
Veterinary record	Yes	Yes
Veterinary technician		Yes
Veterinary therapeutics: research in applied veterinary medicine	Yes	Yes
Vlaams diergeneeskundig tijdschrift		Yes
Wiener tierärztliche Monatsschrift		Yes
Virology		
	PubMed	Science Citation Index Expanded

Antiviral therapy	Yes	Yes
Journal of clinical virology	Yes	Yes
Journal of viral hepatitis	Yes	Yes
Zoology		
	PubMed	Science Citation Index Expanded
International journal of primatology ^{ZR}		Yes
Italian journal of zoology ^{ZR}		Yes
Russian journal of nematology ^{ZR}		Yes
Veterinary and comparative orthopaedics and traumatology: V.C.O.T	Yes	Yes

^(S) indicates that *PubMed* selectively indexes these journals

^{ZR} indicates that the journal is included in *Zoological Record*

Table 2b. Eigenfactor list of biology journals not currently indexed by *BIOSIS Previews* but indexed by *PubMed* or *Science Citation Index Expanded*

Journals in more than one JCR category

Agriculture, Dairy & Animal Science and Ecology		
	PubMed	Science Citation Index Expanded
Rangeland ecology & management ^{ZR}		Yes
Agronomy and Horticulture		
	PubMed	Science Citation Index Expanded
Postharvest biology and technology		Yes
Biochemistry & Molecular Biology and Biophysics		
	PubMed	Science Citation Index Expanded
Pteridines		Yes
Biochemistry & Molecular Biology and Cell Biology		
	PubMed	Science Citation Index Expanded
Cell communication & adhesion	Yes	Yes
Biodiversity Conservation and Evolutionary Biology		
	PubMed	Science Citation Index Expanded
Global change biology ^{ZR}		Yes
Anatomy & Morphology and Biology		

	PubMed	Science Citation Index Expanded
Microscopy research and technique		Yes
Biotechnology & Applied Microbiology and Genetics & Heredity		
	PubMed	Science Citation Index Expanded
Genetic engineering & biotechnology news		Yes
Molecular therapy	Yes	Yes
New genetics and society		Yes
Biotechnology & Applied Microbiology and Plant Sciences		
	PubMed	Science Citation Index Expanded
Plant biotechnology journal	Yes	Yes
Developmental Biology and Evolutionary Biology and Genetics & Heredity		
	PubMed	Science Citation Index Expanded
Evolution & development ^{ZR}	Yes	Yes
Ecology and Horticulture and Limnology and Oceanography		
	PubMed	Science Citation Index Expanded
Revue d'écologie : la terre et la vie ^{ZR}		Yes
Fisheries and Marine & Freshwater Biology		
	PubMed	Science Citation Index Expanded
Bulletin of the European Association of Fish Pathologists ^{ZR}		Yes
Genetics & Heredity and Reproductive Biology		
	PubMed	Science Citation Index Expanded
Twin research and human genetics	Yes	Yes
Horticulture and Limnology and Oceanography		
	PubMed	Science Citation Index Expanded
Advances in enzymology and related areas of molecular biology	Yes	
American journal of health behavior	Yes	
Annual review of nuclear and particle science		Yes
Arkivoc		Yes
Astronomy reports		Yes
Bulletin of experimental biology and medicine		Yes
Chemical communications	Yes ^(S)	Yes
CIRP annals: manufacturing technology		Yes

Comptes rendus Geoscience ^{ZR}		Yes
EDN		Yes
Food and drug law journal	Yes	Yes
Hastings Center report	Yes	Yes
IEEE transactions on aerospace and electronic systems		Yes
IEEE transactions on information theory		Yes
Il nuovo cimento della Società Italiana di Fisica B		Yes
Journal of asthma	Yes	Yes
Journal of personality assessment	Yes	
Journal of sedimentary research		Yes
Journal of the American Podiatric Medical Association	Yes	Yes
Journal of the Professional Association for Cactus Development		Yes
Journal of universal computer science		Yes
Journal of vacuum science & technology B		Yes
Management science		Yes
Nursing education perspectives	Yes	
Ophthalmic genetics	Yes	Yes
Otolaryngology--head and neck surgery	Yes	Yes
Polymer science. Series C		Yes
Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen		Yes
Radiation measurements		Yes
Radiation physics and chemistry		Yes
Research quarterly for exercise and sport	Yes	Yes
Reviews in analytical chemistry		Yes
Russian journal of general chemistry		Yes
Separation science and technology		Yes
SIAM journal on control and optimization		Yes
SMPTE motion imaging journal		Yes
Solid state physics		Yes
Sub-cellular biochemistry	Yes	
Marine & Freshwater Biology and Oceanography		
	PubMed	Science Citation Index Expanded
Journal of marine systems ^{ZR}		Yes
Oceanography and Paleontology		
	PubMed	Science Citation Index Expanded
		Yes

Paleoceanography ^{ZR}		
Veterinary Sciences and Zoology		
	PubMed	Science Citation Index Expanded
Veterinary and comparative orthopaedics and traumatology: V.C.O.T	Yes	Yes

^(S) indicates that PubMed selectively indexes these journals

^{ZR} indicates that the journal is included in Zoological Record

Discussion

Our analysis shows that using citation data as a measure of journal influence can provide insight into the reading patterns of scientists in sub-fields of biology, as exemplified by the data in Tables 2a and 2b. The Eigenfactor score captures a model of research familiar to Bergstrom, who is a working biologist (<http://octavia.zoology.washington.edu/Homepage.html>), by which "readers follow citations as they move from journal to journal" (Bergstrom 2007). This model of research is suited to the widespread and heavy use of the HTML reference lists associated with electronic journal articles which allows smooth transition to other related articles instead of the far more cumbersome approach required by the use of print resources. Electronic publishing, coupled with open access, has produced a growing body of literature with high impact due to increased accessibility to scientists (Tenopir and King 2008). Evans attributes that this phenomenon of increased searching and less browsing has contributed to the narrowing of scientific citation patterns and the elimination of marginally relevant referenced articles (Evans 2008).

Our analysis also shows that researchers in the basic life sciences require access to applied and clinical medical journals. This finding is not surprising considering that life sciences research has the potential of providing partial solutions to several of the most daunting problems that our species and our planet face in the 21st century. The means by which research practices are actually carried out today in the life sciences are profoundly affected by advances in other fields such as applied mathematics, computer science, statistics, physics, and engineering. As a consequence of incorporating these advances, life sciences research is undergoing a significant transformation requiring new approaches of thinking and working. One such approach is the establishment of public-private partnerships, such as Bio-X at Stanford University (<http://biox.Stanford.edu>), and Columbia University's Science and Technology Ventures (<http://www.techventures.columbia.edu/>). Another approach is the development of new disciplines in biology. The field of systems biology which studies complex biological processes by means of both computer modeling and in vivo approaches represents a new way of practicing biology. Systems biology is starting to help the healthcare industry diagnose, treat and ultimately prevent diseases (Camacho and Collins 2009). Developmental biology which focuses on organ regeneration is another example of the new paradigm of biology as an applied science (Xu et al. 2008).

Our study confirms these interdisciplinary collaborations using the citation data method of the Eigenfactor. Along with titles in basic biology, Tables 2a and 2b also reveal applied and clinical journals -- just the type of publications *BIOSIS Previews* acknowledges that are not the focus of its

coverage. This lack of inclusion is relevant to the librarian providing mediated searches, who, may now know that she/he would need to search other databases (such as, *Web of Science*, *PubMed*, *CAB Abstracts*). Library patrons, scientists and students, however may not know to do this, or in many cases cannot do it for lack of access to the *Web of Science*. Thomson-Reuters has developed the *ISI Web of Knowledge*, an integrated Web-based platform that allows concomitant searches of the *Web of Science*, *Current Contents Connect*, and *BIOSIS Previews*. Thus the system searches across all three subscription-based products when one performs an "All Databases Search". An alternative would be for the editors of *BIOSIS Previews* to consider including some of the biology journals currently included in *Science Citation Index Expanded*.

The question of how comprehensively *BIOSIS Previews* should cover the research literature in biology is an issue the BIOSIS editors have been wrestling with and examining since the 1950s ([Steere et al. 1976](#), page 108; [Freedman 1995](#)). Of course, adding even more titles to *BIOSIS Previews* would increase the overlap in coverage between this database and the other databases. Regarding including all journals in any subject field in a database, Cleverdon ([1984](#)) discusses evidence that articles from a relatively small set of journals account for the large majority of papers considered important enough to be cited, and that most end users do not read all the relevant papers retrieved in a literature search. The implications and cost of both database searching and duplicate coverage to the indexing services in *BIOSIS Previews* and other databases has been addressed by Salisbury and Noguera ([2002](#)), Poyer ([1984](#)), and Steere et al. ([1976](#), page 196).

Conclusions

The Eigenfactor method has allowed us to determine in a quantitative manner which journals not indexed by *BIOSIS Previews* have a notable impact in biology. Such an analysis is important for individual scientists, abstract and information producers, libraries, professional societies and funding organizations. This analysis demonstrates the benefit of searching multiple databases for more complete article retrieval in biology.

References

- Banks M. A., & Dellavalle R.** 2008. Emerging alternatives to the impact factor. *OCLC Systems & Services: International digital library perspectives* 24(3): 167-173.
- Barendse, W.** 2007. **The strike rate index: a new index for journal quality based on journal size and the h-index of citations.** *Biomedical Digital Libraries* 4:3. [Online]. Available: <http://www.bio-diglib.com/content/4/1/3> [Accessed February 20, 2009].
- Bergstrom, C. T.** 2007. Eigenfactor: Measuring the value and prestige of scholarly journals. *C&RL News* 68 (5): 314-316.
- Bergstrom, C. T., West, J. D., & Wiseman, M. A.** 2008. The Eigenfactor Metrics. *Journal of Neuroscience* 28(45): 11433-11434.

- Bianchi, S.** 2002. PubMed: For More than Just Medicine This Is One of the World's Greatest Databases. *Issues in Science and Technology Librarianship*. [Online]. Available: <http://www.istl.org/02-spring/databases3.html> [Accessed February 20, 2009].
- Bollen, J., Rodriguez, M. A., & Van de Sompel H.** 2006. Journal Status. *Scientometrics* 69(3): 669-687.
- Bollen, J., Van de Sompel, H., Balakireva, L., & Chute, R.** 2008. A ranking and exploration service based on large-scale usage data. Paper presented at the JCDL '08: Proceedings of the 8th ACM/IEEE-CS joint conference on Digital Libraries, pg 444.
- Brandsma, R., Deurenberg-Vos, H.W.J., Bakker, S., Brand-de Heer, D.L., Otten, R.H.J. & Pinatsis, A.** 1990. A comparison of the coverage of clinical medicine provided by BIOSIS Previews and Medline. *Online Review* 14(6):367-377.
- Brin, S. & Page, L.** 1998. The anatomy of a large-scale hypertextual web search engine. *Computer Networks and ISDN Systems* 30(1-7): 107-117.
- Brooks, K.** 1980. A Comparison of the Coverage of Agricultural and Forestry Literature on Agricola, Biosis, CAB and SciSearch. *Database* 3(1):38-49.
- Camacho, D.M. & Collins, J.J.** 2009. Systems biology strikes gold. *Cell* 137(1):24-26.
- Cameron, B. D.** 2005. Trends in the usage of ISI bibliometric data: uses, abuses, and implications. *Portal - Libraries and the Academy* 5(1): 105-125.
- Cleverdon, C.** 1984. Optimizing convenient online access to bibliographic databases. *Information Services & Use* 4(1/2):37-47.
- Evans J. A.** 2008. Electronic publication and the narrowing of science and scholarship. *Science* 321(5887): 395-9.
- Falagas, M. E., Kouranos, V. D., Arencibia-Jorge, R. & Karageorgopoulos, D. E.** 2008. Comparison of SCImago journal rank indicator with journal impact factor. *Faseb J* 22(8): 2623-2628.
- Fedunok, S.** 2005. Creating a current awareness web page on complexity theory, life sciences, information theory, and entropy. Abstracts of Papers, 229th ACS National Meeting, San Diego, CA, United States, March 13-17, 2005 CINF-109.
- Fitzgerald, C.** 2005. Fifteen million records and counting: BIOSIS maintains a tradition of high quality life sciences data. *KnowledgeLink* [Online]. Available: <http://scientific.thomsonreuters.com/m/pdfs/klnl/2005-08/biosis-15-million-records.pdf> [Accessed February 20, 2009].
- Freedman, B.** 1995. Growth and change in the world's biological literature as reflected in BIOSIS publications. *Publishing Research Quarterly* 11(3): 61-79.

- Garfield, E.** 2006. The history and meaning of the journal impact factor. *JAMA* 295 (1): 90-93.
- Haas, S.C., Lee, C.W. & Battiste, A.L.** 1999. Ecology and ecosystem management: core journals and indexes. *Science & Technology Libraries* 18(1): 3-24.
- Herskovic, J.R., Tanaka, L.Y., Hersh, W., & Bernstam, E.V.** 2007. A day in the life of PubMed: analysis of a typical day's query log. *Journal of the American Medical Informatics Association* 14(2): 212-220
- Hirsch, J. E.** 2005. An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences* 102(46):16569-16572.
- Jones, Y.D.** 2005. Biology article retrieval from various databases: making good choices with limited resources. *Issues in Science and Technology Librarianship*. [Online]. Available: <http://www.istl.org/05-fall/refereed.html> [Accessed February 20, 2009].
- Kusama, M. & Koremura, M.** 1988. Comparison of each database on the field of vitaminology. *Joho no Kagaku to Gijutsu (Journal of the Information & Technology Association of Japan)* 38(3):119-124.
- Lorent, J.P.** 1979. Online literature retrieval in poison control. *Clinical Toxicology*14(1): 115-122.
- Markham, J. W. & Huber, C. F.** 2005. Chemistry meets marine biology: where is the literature indexed? Abstracts of Papers, 229th ACS National Meeting, San Diego, CA, United States, March 13-17, 2005 CINF-108.
- National Library of Medicine.** 2009. List of Journals Indexed for MEDLINE (Total Journals 5,246) <http://www.nlm.nih.gov/tsd/serials/lji.html> [Accessed February 20, 2009].
- Nixon, J.M.** 1989. Online searching for human nutrition: an evaluation of databases. *Medical Reference Services Quarterly* 8(3): 27-35.
- Pinski, G. & Narin, F.** 1976. Citation influence for journal aggregates of scientific publications: theory, with application to the literature of physics. *Information Processing & Management*, 12 (5): 297-312.
- Poyer, R.K.** 1984. Journal article overlap among Index Medicus, Science Citation Index, Biological Abstracts, and Chemical Abstracts. *Bulletin of the Medical Library Association* 72(4):353-357.
- Salisbury, L. & Noguera, E.** 2002. The coverage and duplication of journals in Cambridge Scientific Abstracts (CSA): Bioengineering Database and other science and engineering databases. *Electronic Journal of Academic & Special Librarianship* 3(3). [Online]. Available:http://southernlibrarianship.icaap.org/content/v03n03/Salisbury_102.htm [Accessed February 20, 2009].

- Steere, W.C., Parking, P.V. & Philson H.A.** 1976. *Biological Abstracts/BIOSIS: The First Fifty Years, the Evolution of a Major Science Information Service*. New York: Plenum Press.
- Snow, B.** 1998. Alternative medicine information sources. *Database*, 21(3):19-29
- Snow, B.** 1990. Online searching for alternatives to animal testing. *Online*, 14(4): 94-97.
- Ten Have, B.** 2006. Journal evaluation and source coverage policies for BIOSIS products. [Online]. Available: {http://thomsonreuters.com/products_services/science/free/essays/journal_evaluation_biosis/} [Accessed February 20, 2009].
- Tenopir, C., and King D. W.** 2008. Electronic journals and changes in scholarly article seeking and reading patterns. *D-Lib Magazine*, 14 (11/12). [Online]. Available:<http://www.dlib.org/dlib/november08/tenopir/11tenopir.html> [Accessed February 20, 2009].
- Thomson Reuters.** 2006. BasicBIOSIS vs. Biological Abstracts vs. BIOSIS Previews. [Online]. Available:http://www.isiwebofknowledge.com/media/pdf/BasicBIOSIS_vs_BA_BP.pdf. [Accessed February 20, 2009].
- Thomson Reuters.** 2009a. BIOSIS Previews. [Online]. Available: {http://thomsonreuters.com/products_services/science/science_products/a-z/biosis_previews/} [Accessed February 20, 2009].
- Thomson Reuters.** 2009b. BIOSIS Previews Fact Sheet. [Online]. Available: {<http://scientific.thomsonreuters.com/media/biosispdfs/factsheet/BP-English.pdf>}. [Accessed February 20, 2009].
- Thomson Reuters.** 2009c. BIOSIS Previews -- List of Journals. [Online]. Available:<http://scientific.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi?PC=BP> [Accessed January 2, 2009].
- Thomson Reuters.** 2009d. Science Citation Index Expanded, [Online]. Available: {http://thomsonreuters.com/products_services/science/science_products/a-z/science_citation_index_expanded?parentKey=555184,539593} [Accessed February 20, 2009].
- Thomson Reuters.** 2009e. Science Citation Index Expanded -- List of Journals. [Online]. Available: <http://scientific.thomsonreuters.com/cgi-bin/jrnlst/jloptions.cgi?PC=D> [Accessed February 20, 2009].
- Xu, Y. Shi, Y. & Ding, S.** 2008. A chemical approach to stem-cell biology and regenerative medicine. *Nature* 453(7193):338-344.