



# Ranking forestry journals using the *h*-index

Jerome K. Vanclay\*

Southern Cross University, PO Box 157, Lismore, NSW 2480, Australia

## ARTICLE INFO

### Article history:

Received 14 May 2008

Received in revised form 1 July 2008

Accepted 1 July 2008

### Keywords:

Hirsch index

Research Quality Framework

Journal Impact Factor

Journal ranking

Forestry

## ABSTRACT

An expert ranking of forestry journals was compared with Journal Impact Factors and *h*-indices computed from the ISI Web of Science and internet-based data. Citations reported by Google Scholar offer an efficient way to rank all journals objectively, in a manner consistent with other indicators. This *h*-index exhibited a high correlation with the Journal Impact Factor ( $r=0.92$ ), but is not confined to journals selected by any particular commercial provider. A ranking of 180 forestry journals is presented, on the basis of this index.

© 2008 Elsevier Ltd. All rights reserved.

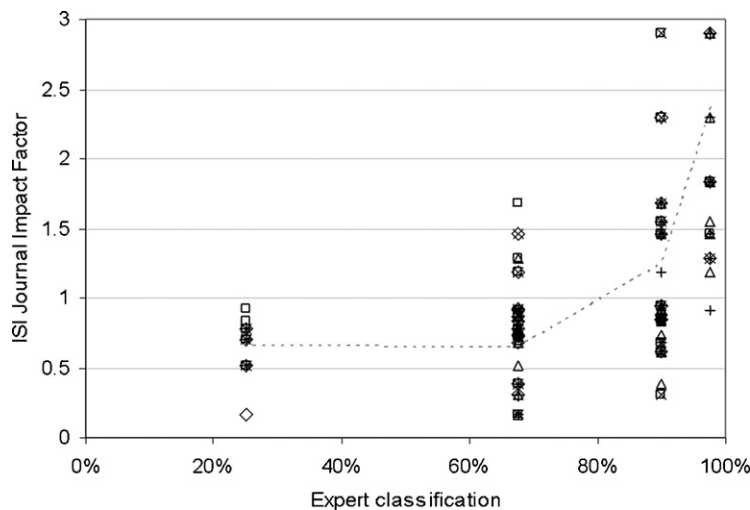
## 1. Introduction

The Thomson Scientific (TS) Journal Impact Factor (JIF; Garfield, 1955) has been the dominant measure of journal impact, and is often used to rank journals and gauge relative importance, despite several recognised limitations (Dellavalle, Schilling, Rodriguez, Van de Sompel, & Bollen, 2007; Dong, Loh, & Mondry, 2005; Hecht, Hecht, & Sandberg, 1998; Moed, 2005; Moed, van Leeuwen, & Reedijk, 1999; Saha, Saint, & Christakis, 2003; van Leeuwen, Moed, & Reedijk, 1999). Other providers offer alternative journal rankings (e.g., Lim et al., 2007), but most deal with a small subset of the literature in any discipline. Hirsch's *h*-index (Bornmann & Daniel, 2007a; Hirsch, 2005; van Raan, 2006) has been suggested as an alternative that is reliable, robust and easily computed (Braun, Glänzel, & Schubert, 2006; Chapron & Husté, 2006; Olden, 2007; Rousseau, 2007; Schubert & Glänzel, 2007; Vanclay, 2007, in press). The *h*-index has also been used to rank researchers (Bornmann & Daniel, 2007b; Grant et al., 2007; Oppenheim, 2006; Schreiber, 2007), institutions (Bar-Ilan, 2007; Prathap, 2006; Smith, 2008) and topics. This study presents an analysis of the JIF, *h*-index, and other indicators of journal utility, with a view to ranking forestry literature.

In preparation for the Australian government's Research Quality Framework (RQF; DEST, 2007; Gale, Gilbert, Seddon, & Wright, 2005), professional bodies in Australia were asked to identify and rank relevant journals within their discipline into four prestige bands, based on journal quality. Participants were asked to allocate journals to one of four classes, representing the top 5 percentile (A1), the 80–95 percentile (A), the 50–80 percentile (B), and the residue (C). The classification offered by the Institute of Foresters of Australia (personal communication, 21 November 2007) implied a ranking substantially different to the JIF, even though the 2005 JIF data were available to members to assist them in their classification. The wide range of JIFs within an assigned band was noteworthy, as was the disagreement regarding the top journal. This study attempts to shed some light on this discrepancy.

\* Tel.: +61 2 6620 3147; fax: +61 2 6621 2669.

E-mail address: [JVanclay@scu.edu.au](mailto:JVanclay@scu.edu.au).



**Fig. 1.** Journal Impact Factors contrasted with an expert classification of 27 forestry journals by four individuals into four classes (using different symbols for each expert).

## 2. Methods

The study draws on subjective journal rankings proposed by four individuals, nominated by and senior members of the Institute of Foresters of Australia, which was asked by the Australian Academy of Technological Sciences and Engineering (ATSE, 2007) to assist in ranking forestry journals in terms of academic standing. The author played no part in the selection of these experts, and the ranking offered by the author has been omitted from this analysis. Three of the experts had a PhD, and represented current or past heads of a university department, a national research agency, a development assistance agency, and a consultancy firm.

The Institute of Foresters of Australia publishes one of the journals under consideration, *Australian Forestry*. Three of the four experts placed *Australian Forestry* in the top 15% of journals, whereas this study suggests that it is near the 76 percentile, suggesting some parochial bias by the experts. However, the rankings by the individual experts tended to be consistent, exhibiting correlations of  $r \geq 0.69$  (Fig. 1; Table 1).

This study also draws on Journal Impact Factors from the 2006 Journal Citation Reports, and on  $h$ -indices computed automatically from two sources, the ISI Web of Science (Thomson Scientific, version 4.0, WoS) and Harzing's (2007) Publish or Perish (PoP), a software package that harvests data from Google Scholar (GS), a specialised internet search engine restricted to scholarly documents (Kousha & Thelwall, 2008; Meho & Yang, 2007; Noruzi, 2005; Pauly & Stergiou, 2005).

Although the  $h$ -index is robust (Vanclay, 2007), automated calculation may be biased by typographic and other database errors (Jacso, 2008). Several precautions were adopted to minimize such bias. The  $h$ -index calculation was performed both using the full journal title and using common abbreviations (e.g., to detect problems such as *Ann. For. Sci.* which is not recognised by GS as *Annals of Forest Science*). Citation lists reported by PoP were sorted by author and by title to facilitate detection and correction of typographic errors and missing details (e.g., such as the lack of machine-readable publication dates in *Tree-Ring Research*).

Hirsch's  $h$ -indices were computed for several intervals (Table 1), but the 8-year interval 2000–2007 seemed insightful for forestry journals, many of which have a long cited half-life. The  $h$ -indices computed from WoS and GS data are similar ( $r = 0.93$ ,  $n = 43$  for 2000–2007 data), but the former are available only for WoS-listed journals (about 15% of forestry journals), whereas the latter can be computed for any journal or citation visible to Google Scholar.

## 3. Results

Table 1 and Fig. 1 illustrate the correspondence between a classification allocated by experts and the JIF, for each of the four contributors and the 27 journals recognised by both ATSE (2007) and WoS. There was a considerable discrepancy between the assigned classification and the JIF-based ranking of forestry journals. In Fig. 1, the spread of points and the weak trend illustrate the magnitude of the differences between experts and the ranking implied by the JIF. The shape of the trend is not unexpected, because the WoS data are censored to represent the top few journals (about 15%). Although variants of  $h$ -index is well correlated with the JIF ( $r \geq 0.75$ ; Table 1), it exhibits closer agreement with the expert assessment ( $r \geq 0.52$ ) than does the JIF ( $r = 0.52$ ), suggesting that the  $h$ -index may be useful for ranking journals objectively. An advantage of the PoP  $h$ -index is that it may be computed for the many journals not acknowledged by Thomson Scientific.

Expert ranking of two journals, *Agricultural and Forest Meteorology* (AFM) and *Forest Ecology and Management* (FEM), differed greatly to that implied by the JIF. The former has a higher JIF, but experts ranked the latter as more influential, as did

**Table 1**

Journal Impact Factors contrasted with an expert classification of 27 forestry journals by four individuals into four classes

	Expert assignment				Weighted score <sup>a</sup>	ISI JIF	ISI <i>h</i> -index	PoP <i>h</i> -index 2000–07	PoP lifetime <sup>b</sup> <i>h</i> -index
	A1	A	B	C					
Journal									
Forest Ecology and Management	4				3.90	1.8	36	43	69
Agricultural and Forest Meteorology	2	2			3.75	2.9	43	41	67
Tree Physiology	1	3			3.68	2.3	35	28	41
Annals of Forest Science	3		1		3.60	1.3	18	19	32
International Forestry Review		4			3.60	0.6	8	12	18
Forestry		4			3.60	0.8	14	16	31
Australian Journal of Botany		4			3.60	0.9	30	21	40
Trees-Structure and Function		4			3.60	1.5	20	22	36
Canadian Journal of Forest Research		4			3.60	1.5	33	23	18
New Forests		3	1		3.38	0.7	10	11	25
Silva Fennica		3	1		3.38	0.9	17	14	23
International Journal of Wildland Fire		3	1		3.38	1.7	17	21	29
Forest Science	2		2		3.30	1.5	20	19	54
Silvae Genetica		2	2		3.15	0.3	8	9	23
Forest Policy and Economics	1		3		3.00	0.9	11	17	16
Journal of Forestry		1	3		2.93	1.2	18	8	37
European Journal of Forest Research			4		2.70	0.8	7	6	22
Forest Pathology			4		2.70	0.7	12	11	11
Wood Science & Technology			4		2.70	0.7	12	13	30
Forest Products Journal			4		2.70	0.4	13	14	19
Scandinavian Journal of Forest Research			4		2.70	0.9	16	18	25
Journal of tropical forest science			3	1	2.28	0.2	3	7	15
Forestry Chronicle			3	1	2.28	0.8	14	13	20
Agroforestry Systems			3	1	2.28	0.9	15	19	39
Northern Journal of Applied Forestry				4	1.00	0.8	6	6	11
Western Journal of Applied Forestry				4	1.00	0.5	6	8	17
Southern Journal of Applied Forestry				4	1.00	0.7	6	9	21
Correlations									
Aggregate score					1	0.52	0.64	0.61	0.52
ISI JIF					0.52	1	0.88	0.84	0.75
ISI <i>h</i> -index					0.64	0.88	1	0.90	0.76
2000–7 PoP <i>h</i> -index					0.61	0.84	0.90	1	0.82
Lifetime PoP <i>h</i> -index					0.52	0.75	0.76	0.82	1

<sup>a</sup> Score computed with weights 0.975, 0.9, 0.675 and 0.25 reflecting the percentile represented by A1, A, B and C (95–100, 85–95, 50–85 and 0–50%, respectively).

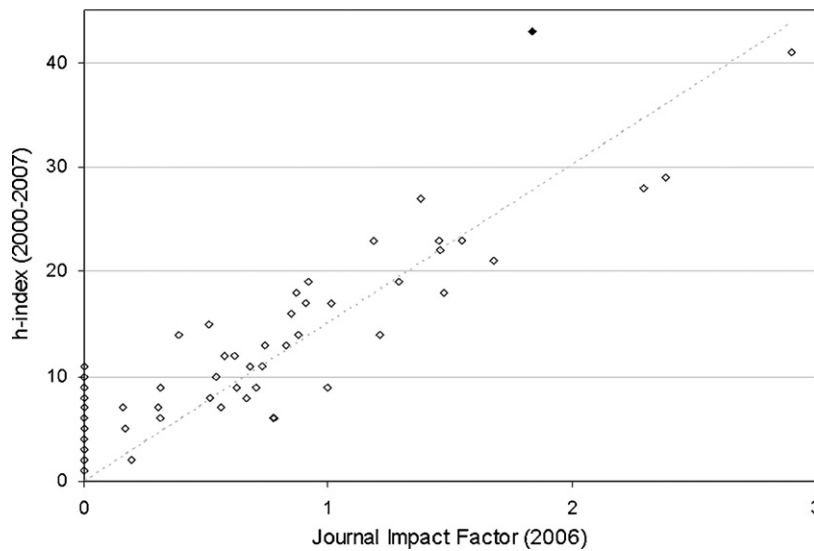
<sup>b</sup> 'Lifetime' implies unconstrained by date, drawing on all entries within the database.

the *h*-index (Table 1, Fig. 2). Table 2 lists some key differences between these journals: AFM has a relatively small number of contributions, many of which are cited soon after publication, whereas FEM has a higher volume and is slower to accrue citations. Overall, the *h*-indices of the journals are comparable, but there is a tendency for WoS to report higher statistics for AFM, and for PoP to report higher statistics for FEM. Superficial examination of Table 1 may lead to the suggestion that AFM

**Table 2**

Statistics for two of the top-ranked forestry journals

Indicator	Agricultural and Forest Meteorology	Forest Ecology and Management
Panel assessment	A1/A (95 percentile)	A1 (95–100 percentile)
Year established	1964	1977
JIF (2006)	2.903	1.839
Immediacy	0.669	0.356
Cited half-life	6.7	5.8
Total articles	130	601
Lifetime <i>h</i> -index (WoS)	60	58
<i>h</i> -Index 2005–2006	12	12
<i>h</i> -Index 2000–2007	43	36
Total cites 2000–2007	9 113	21 470
Lifetime <i>h</i> -index (PoP)	67	69
<i>h</i> -Index 2005–2006	9	12
Mean cites/paper 2005–2006	2.09	1.67
<i>h</i> -Index 2000–2007	41	43
Total cites 2000–2007	8 544	25 913



**Fig. 2.** The relationship between the JIF and the PoP *h*-index (based on all citations accruing to journal publications during 2000–2007). The filled point near the top of the figure is *Forest Ecology and Management*; *Agricultural and Forest Meteorology* is at the top right. Journals not recognised by Thomson Scientific are shown with a zero JIF, and are omitted from the calculation of the trend line (trend based on 43 journals).

publishes relatively few papers all of which are high-quality, reflecting a high editorial standard, and in turn, credit to any author who has a paper accepted for publication (which is what the RQF seeks to achieve). However, this interpretation is simplistic, and warrants closer examination.

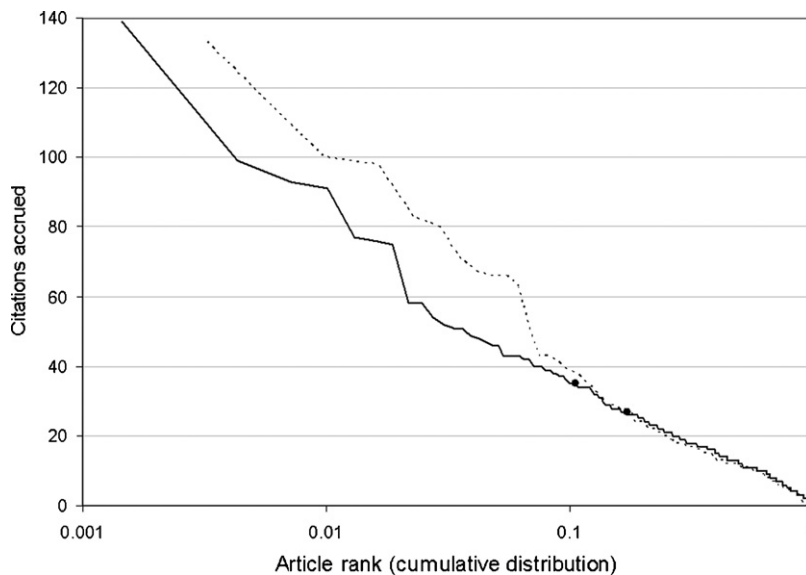
The RQF seeks a proxy for research quality, and assumes that acceptance and publication by a journal indicates attainment of the standard indicated by the journal's ranking. The JIF is deficient for this purpose, because it reflects the average number of citations, and may conceal many 'free-riders' (Walter, Bloch, Hunt, & Fisher, 2003). Table 3 examines this issue, year-by-year for the last decade, and tabulates the proportion of papers in each journal that remain uncited (Weale, Bailey, & Lear, 2004), or fail to accrue at least one citation per year since publication. Despite its lower JIF, FEM has a lower proportion of papers that remain uncited, or that remain infrequently cited, for almost every year during the past decade, suggesting that by these yardsticks, FEM may be the journal that reflects better on contributors. This conclusion from Table 3 is reflected in the *h*-index, but not in the JIF (Table 2). Table 3 also illustrates that the *h*-index appears to plateau after 8 years (i.e., in 2000), at least for these two forestry journals.

Fig. 3 illustrates the trends in citations to individual papers published in these two journals during the year 2000. The publication year 2000 was chosen because it reflects the half-life of these journals, and allows citation patterns to be fully expressed (Table 3; also Vanclay, in press). Fig. 3 reveals the number of citations for each paper in rank order, scaled to reflect the cumulative distribution function because of a threefold difference in the number of papers published in these two journals. A logarithm scale is used because the great majority of papers accrue few citations, and exhibit a log-linear trend in their citation rate.

**Table 3**

Annualized data for two forestry journals, using *h*-indices calculated at end 2007

Year	Agricultural and Forest Meteorology				Forest Ecology and Management			
	<i>h</i> -Index (WoS)	<i>h</i> -Index (PoP)	Fraction uncited (annualized %)	Not cited >1/year (%)	<i>h</i> -Index (WoS)	<i>h</i> -Index (PoP)	Fraction uncited (annualized %)	Not cited >1/year (%)
2007	3				2			
2006	6	4	49	49	7	6	62	62
2005	12	9	45	39	12	13	46	38
2004	18	15	54	35	16	18	47	34
2003	19	17	65	48	21	24	53	33
2002	20	17	71	45	26	29	55	33
2001	22	20	67	42	24	30	64	38
2000	24	27	71	39	30	35	64	38
1999	24	25	65	34	28	34	71	40
1998	21	23	70	35	31	34	73	44
Mean			62	41			59	40



**Fig. 3.** Pattern of citation accrual to two journals, *Agricultural and Forest Meteorology* (dotted) and *Forest Ecology and Management* (solid), using data from PoP. Note that the linear trend in the right-most part of the figure includes the point indicating the  $h$ -index (●).

Fig. 3 shows that the two journals have a very similar pattern of citation accrual to the majority of contributions, and that it is only in the most-frequently cited 10% of papers that differences in citations appear. This equivalence is reflected in the  $h$ -indices (27 for AFM, 35 for FEM, PoP data), but not in the JIFs of the two journals (Table 2), which assigns a substantially higher score to AFM.

The log-linear trend in citation accrual (Fig. 3) appears generic (Burrell, 2007), applies to many journals, and is neatly summarised by the  $h$ -index, since it reflects the gradient of this relationship. Fewer than  $h$  papers (where  $h$  is the  $h$ -index) depart from this trend (i.e., those at the top left of Fig. 3), and appear to reflect the fortunate juxtaposition of easy accessibility and a topical issue, rather than research quality *per se*. The pattern revealed in Fig. 3 leads to the suggestion that a classification of journals based on the  $h$ -index provides a better indicator for the RQF than the JIF. Fig. 3 implies that the median journal contribution will be cited about  $h/3$  times, an estimate that (unlike the JIF) is unaffected by the few papers that are frequently cited. A further advantage is that it can be calculated quickly and easily (e.g., with the PoP software; Harzing, 2007) for all journals, including those not recognised by Thomson Scientific. Fig. 2 includes 43 journals recognised by Thomson Scientific, but also includes 43 journals with  $h \geq 4$  not recognised by Thomson Scientific and without a JIF.

Tables 2 and 3, and Fig. 3 suggest that AFM and FEM are similar in many regards, but Fig. 2 highlights the large discrepancy between the JIF and the  $h$ -index for these two journals. The total number of citations reported in Table 2 may shed some light on this difference. AFM appears to service a specialised audience that is more visible to Thomson Scientific than to Google Scholar. In contrast, FEM is cited in a substantial number of non-academic publications visible to Google Scholar, which reports 20% more citations than WoS (Table 2). An analysis of the differences in citation patterns for these 20,000 citations is a formidable task, but an insight may be gained by examining the differences in the few papers that contribute to the  $h$ -index estimated from TS and PoP records. The FEM papers contributing to the TS  $h$ -index (2000–2007) of 36 are not a complete subset of those contributing to the PoP  $h$ -index of 43, so there are 19 papers contributing to the PoP  $h$ -index but not the WoS  $h$ -index (Table 3). These 19 papers were cited a total of 1022 times, half of which (according to GS) accrued from WoS-listed journals, and the remainder from various sources including academic and government publications (Table 4). In the case of these 19 papers, there are at least as many citations from non-WoS sources as there are from WoS-listed journals. In this particular example, most these citations appear to *bona fide* and draw upon, rather than criticise the cited works. The citation of these FEM papers in academic theses and government reports (Table 5) suggests that FEM reaches practitioners as well as researchers. Although unproven, the difference in ratio of PoP:WoS  $h$ -indices (0.94 for AFM and 1.2 for FEM) seems to suggest that AFM is cited mainly by (and hence likely to be used mainly by) researchers, while the higher ratio for FEM may indicate greater uptake by practitioners.

#### 4. Discussion

There is no doubt that an  $h$ -index based on Google Scholar is imperfect (Jacso, 2008), in part because it can be manipulated with bogus documents on personal websites, and may be inflated by provocative contributions (such as A.D. Sokal's satirical 1996 contribution to *Social Text*, for which WoS records 18 citations, compared to 339 citations recorded by Google Scholar).

**Table 4**Papers contributing to the PoP *h*-index, but excluded from the WoS *h*-index (2000–2007) for *Forest Ecology and Management*

Cites	Authors	Title	Year
114	de Vries et al.	Intensive monitoring of forest ecosystems in Europe ...	2003
97	Guariguata, Ostertag	Neotropical secondary forest succession ...	2001
72	Marcot et al.	Using Bayesian belief networks to evaluate fish and wildlife ...	2001
61	Swank et al.	Long-term hydrologic and water quality responses ...	2001
58	Schoenholtz et al.	A review of chemical and physical properties as indicators of forest soil ...	2000
56	Ripple, Beschta	Wolf reintroduction, predation risk, and cottonwood recovery ...	2003
54	Gardiner, Quine	Management of forests to reduce the risk of abiotic damage ...	2000
52	Tiedemann et al.	Solution of forest health problems with prescribed fire ...	2000
51	Vesterdal et al.	Change in soil organic carbon following afforestation ...	2002
51	Griffis et al.	Understorey response to management treatments in northern Arizona ...	2001
48	Liski et al.	Increasing carbon stocks in the forest soils of western Europe.	2002
48	Knoepp et al.	Biological indices of soil quality: an ecosystem case study of their use.	2000
48	Bowman et al.	The association of small mammals with coarse woody debris ...	2000
47	Fule et al.	Comparing ecological restoration alternatives ...	2002
46	Ketterings et al.	Reducing uncertainty in the use of allometric biomass equations ...	2001
46	Emborg et al.	The structural dynamics of Suserup Skov ...	2000
45	Pretzsch et al.	The single tree-based stand simulator SILVA ...	2002
43	Kavvadias et al.	Litterfall, litter accumulation and litter decomposition rates ...	2001
43	Yanai et al.	Challenges of measuring forest floor organic matter dynamics ...	2000

**Table 5**Sources of citations contributing to the PoP *h*-index but not to the WoS *h*-index (2000–2007) for *Forest Ecology and Management*

Source of citation	Cites (%)
WoS-listed journals (including FEM self-citations 9%)	49
Academic publications (including theses 10%)	15
Journals not listed by WoS (mostly refereed)	12
Government publications	12
Books	6
Conferences proceedings and presentations	3
Publications by NGOs and associations	3
Consultants reports and other commercial documents	1
Total	100

However, the JIF is also imperfect, because it is available only for journals selected by Thomson Scientific, and because of limitations in the calculation of the JIF (Dong et al., 2005; Jacso, 2001; Vanclay, in press).

The appendix offers a list of 180 forestry journals that have been cited at least once since 2000, and appear to contribute to forestry research and practice. This list has been compiled from the Thomson Scientific list, the Forest Science Database, Ulrich's Periodicals Directory, JournalSeek and Metla's Virtual Forestry library, further supplemented with Google Scholar searches for journals with a high frequency of forestry terms. The list was then culled to remove non-core forestry material, by removing titles that infrequently mentioned core forestry terms (such as forestry, silviculture, wood and timber). Google Scholar makes it easy to identify such journals efficiently, and to judge objectively whether or not a journal is central to a discipline. The list was ranked using *h*-indices computed by PoP (and for *Tree-Ring Research*, manually from GS data). RQF classifications (A1, A, B, C) were assigned to the 180 journals cited more than once during 2000–2007.

## 5. Conclusion

The ranked list of journals provided in the appendix has several implications. Thomson Scientific may wish to recognise more of the high-ranked journals (such as *Dendrochronologia* with *h*-index 11), editors of some journals may wish to work with Google to make their contents more visible to search engines (e.g., *Ann. For. Sci.* which is not recognised by Google as *Annals of Forest Science*, and *Tree-Ring Research* which does not provide the date of publication in Google-readable format), and editors of journals not published in English (which are disadvantaged in internet searches) may wish to add English abstracts and keywords to raise their profile.

Because of its broader coverage and despite known deficiencies, Hirsch's *h*-index based on Google Scholar data may be more useful than the Journal Impact Factor, as a measure of journal quality, and in providing a basis to rank journals.

**Appendix A. Ranked list of 180 selected forestry journals**

Full title	JIF	<i>h</i> -Index 2000–2007	Class
Forest Ecology and Management	1.839	43	A1
Agricultural and Forest Meteorology	2.903	41	A1
Journal of Vegetation Science	2.382	29	A1
Tree Physiology	2.297	28	A1
Plant Ecology (Vegetatio)	1.383	27	A1
Canadian Journal of Forest Research	1.549	23	A1
Forest Science	1.457	23	A1
Journal of Forestry	1.188	23	A1
Trees Structure and Function	1.461	22	A1
International Journal of Wildland Fire	1.679	21	A1
Annals of Forest Science	1.290	19	A
Agroforestry Systems	0.921	19	A
Agricultural and Forest Entomology	1.473	18	A
Scandinavian Journal of Forest Research	0.868	18	A
Holzforschung	1.014	17	A
Forest Policy and Economics	0.907	17	A
Forestry	0.847	16	A
Holz als Roh- und Werkstoff	0.514	15	A
Applied Vegetation Science	1.214	14	A
Silva Fennica	0.878	14	A
Forest Products Journal	0.387	14	A
Forestry Chronicle	0.831	13	A
Wood Science and Technology	0.740	13	A
International Forestry Review	0.618	12	A
Journal of Wood Science	0.574	12	A
Forest Pathology	0.729	11	A
New Forests	0.681	11	A
Dendrochronologia		11	A
Unasylva		11	A
Wood and Fiber Science	0.540	10	A
Revista Arvore		10	A
Journal of Wood Chemistry and Technology	1.000	9	B
Southern Journal of Applied Forestry	0.704	9	B
Tree-Ring Research	0.625	9	B
Silvae Genetica	0.311	9	B
European Journal of Forest Pathology		9	B
Journal of Forest Economics		9	B
IAWA Journal	0.667	8	B
Western Journal of Applied Forestry	0.515	8	B
Forests, Trees and Livelihoods		8	B
Forstwissenschaftliches Centralblatt (German Journal of Forest Science)		8	B
Urban Forestry & Urban Greening		8	B
Nordic Pulp & Paper Research Journal	0.562	7	B
Appita Journal	0.301	7	B
Journal of Tropical Forest Science	0.160	7	B
Australian Forestry		7	B
Forest Genetics		7	B
Journal of Sustainable Forestry		7	B
Linze Kexue (Scientia Silvae Sinicae)		7	B
Small-Scale Forestry		7	B
Tasforests		7	B
Northern Journal of Applied Forestry	0.779	6	B
European Journal of Forest Research	0.776	6	B
Allgemeine Forst- und Jagdzeitung	0.315	6	B
Ciencia Florestal		6	B
Forst und Holz		6	B
International Journal of Forest Engineering		6	B
Investigacion Agraria. Sistemas y Recursos Forestales		6	B
Journal of Forest and Livelihood		6	B
Journal of Forest Research		6	B
Scientia Forestalis		6	B
Mokuzai Gakkaishi (Journal of the Japan Wood Research Society)	0.168	5	B
Bois et Forêts des Tropiques		5	B
Cerne		5	B
Dendrobiology		5	B
Floresta e Ambiente		5	B
Forest Snow and Landscape Research		5	B
Journal of Beijing Forestry University		5	B
Journal of Forest Science		5	B
Journal of the Japanese Forestry Society		5	B



## Appendix A (Continued)

Full title	JIF	h-Index 2000–2007	Class
L'italia Forestale e Montana		5	B
Revue Forestiere Francaise		5	B
American Forests		4	C
Baltic Forestry		4	C
Floresta		4	C
Forstarchiv		4	C
Indian Forester		4	C
Journal of Forest Planning		4	C
Journal of Nanjing Forestry University		4	C
New Zealand Journal of Forestry Science		4	C
Quarterly Journal of Forestry		4	C
Sherwood - Foreste ed Alberi Oggi		4	C
Silva Lusitana		4	C
Southern Hemisphere Forestry Journal		4	C
Allgemeine Forst Zeitschrift		3	C
Centralblatt für das Gesamte Forstwesen		3	C
Fire Ecology		3	C
Forest Biometry Modelling and Information Sciences		3	C
Forest Genetic Resources		3	C
ITTO Tropical Forest Update		3	C
Journal of Forest Engineering		3	C
Journal of Fujian College of Forestry		3	C
Journal of Northeast Forestry University		3	C
Journal of the Institute of Wood Science		3	C
Journal of the Japanese Forest Society		3	C
Journal of the Korean Forestry Society		3	C
Journal of Zhejiang Forestry College		3	C
Madera y Bosques		3	C
New Zealand Journal of Forestry		3	C
Scottish Forestry		3	C
Skoven		3	C
Sylvan: Czasopismo Lesne		3	C
Taiwan Journal of Forest Science		3	C
World Forestry Research		3	C

Forestry journals with 1–2 citations during 2000–2007: Agroforestry Today, Annales de la Recherche Forestiere au Maroc, Annali - Accademia Italiana di Scienze Forestali, Annals of Forestry, Australian Forest Grower, Austrian Journal of Forest Science, Drvna Industrija, East African Agricultural and Forestry Journal, Eurasian Journal of Forest Research, Fakta Skog, Folia Amazonica, Folia Forestalia, Folia Forestalia Polonica, Folia Oecologica, Forest and Bird, Forest and Landscape Research, Forest History, Forest History Today, Forest Inventory and Planning, Forest Pest and Disease, Forest Science and Technology, Forestry & British Timber, Forestry and Society, Forstzeitung, Frontiers of Forestry in China, Ghana Journal of Forestry, Holztechnologie, Indian Journal of Agroforestry, Indian Journal of Forestry, International Journal of Forest Usufructs Management, Iranian Journal of Forest and Poplar Research, Iranian Journal of Rangelands and Forests Plant Breeding and Genetic Research, Irish Forestry, Journal of Agriculture and Forestry, Journal of Forest Policy, Journal of Forest Products Business Research, Journal of Jiangsu Forestry Science & Technology, Journal of Research Forest of Kangwon National University, Journal of the Experimental Forest of National Taiwan University, Journal of The Fujian Agriculture and Forestry University, Journal of The Timber Development Association of India, Journal of Tropical Forest Products, Journal of Tropical Forest Resources, Journal of Tropical Forestry, Journal of Zhejiang Forestry Science and Technology, KFRI Journal of Forest Science (Seoul), Malaysian Forester, Metsätieteen Aikakauskirja, Myforest, Nederlands Bosbouw Tijdschrift, New Zealand Forestry, Nigerian Journal of Forestry, Norsk Skogbruk, Österreichische Forstzeitung, Pakistan Journal of Forestry, PNG Journal of Agriculture Forestry and Fisheries, Protection Forest Science and Technology, Quarterly Journal of Chinese Forestry, Range Management and Agroforestry, Revista Chapingo: Serie Ciencias Forestales y del Ambiente, Revista Forestal Centroamericana, Revista Forestal Latinoamericana, Revista Forestal Venezolana, Revista Padurilor, Scandinavian Forest Economics, Schweizerische Zeitschrift Für Forstwesen, Temperate Agroforester, Thai Forest Bulletin, The Lao Journal of Agriculture and Forestry, Tohoku Journal of Forest Science, Tree-Ring Bulletin, Tropical Forestry, Turkish Journal of Agriculture and Forestry, Wood & Wood Products, Wood Research, and Wood Technology (Traetchnik).

## References

- ATSE. (2007). RQF Journal Ranking Project. Australian Academy of Technological Sciences and Engineering. Retrieved December 7, 2007 from <http://www.atse.org.au/index.php?sectionid=1096>.
- Bar-Ilan, J. (2007). Informetrics at the beginning of the 21st century—a review. *Journal of Informetrics*, 2(1), 1–52.
- Bornmann, L., & Daniel, H.-D. (2007a). What do we know about the h-index? *Journal of the American Society for Information Science and Technology*, 58, 1381–1385.
- Bornmann, L., & Daniel, H.-D. (2007b). Convergent validation of peer review decisions using the h-index: Extent of and reasons for type I and type II errors. *Journal of Informetrics*, 1(3), 204–213.
- Braun, T., Glänzel, W., & Schubert, A. (2006). A Hirsch-type index for journals. *Scientometrics*, 69(1), 169–173.
- Burrell, Q. L. (2007). Hirsch's h-index: A stochastic model. *Journal of Informetrics*, 1(1), 16–25.
- Chapron, G., & Hústé, A. (2006). Open, fair and free journal ranking for researchers. *Bioscience*, 56(7), 558–559.
- Dellavalle, R. P., Schilling, L. M., Rodriguez, M. A., Van de Sompel, H., & Bollen, J. (2007). Refining dermatology Journal Impact Factors using PageRank. *Journal of the American Academy of Dermatology*, 57, 116–119.
- DEST. (2007). Research Quality Framework. Department of Education, Science and Technology, Australian Government, Retrieved December 2, 2007 from [http://www.dest.gov.au/sectors/research\\_sector/policies\\_issues\\_reviews/key\\_issues/research\\_quality\\_framework/](http://www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/research_quality_framework/).
- Dong, P., Loh, M., & Mondry, A. (2005). The "impact factor" revisited. *Biomedical Digital Libraries*, 2, 7. doi:10.1186/1742-5581-2-7
- Garfield, E. (1955). Citation indexes for science. *Science*, 122, 108–111.



- Gale, T., Gilbert, R., Seddon T., & Wright, J. (2005). The RQF and educational research in Australia: Implications and responses across the research community. Paper presented to the Annual Conference of the Australian Association for Research in Education, Sydney, November 2005. Retrieved December 2, 2007 from <http://www.aare.edu.au/05pap/gil05744.pdf>.
- Grant, J. B., Olden, J. D., Lawler, J. J., Nelson, C. R., Brian, R., & Silliman, B. R. (2007). Academic institutions in the United States and Canada ranked according to research productivity in the field of conservation biology. *Conservation Biology*, 21(5), 1139–1144.
- Harzing, A. W. (2007). Publish or Perish. Retrieved December 7, 2007 from <http://www.harzing.com/pop.htm>.
- Hecht, F., Hecht, B. K., & Sandberg, A. A. (1998). The Journal Impact Factor: A misnamed, misleading, misused measure. *Cancer Genetics and Cytogenetics*, 104, 77–81.
- Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences*, 102, 16569–16572.
- Jacso, P. (2001). A deficiency in the algorithm for calculating the impact factor of scholarly journals: The Journal Impact Factor. *Cortex*, 37, 590–594.
- Jacso, P. (2008). The plausibility of computing the *h*-index of scholarly productivity and impact using reference-enhanced databases. *Online Information Review*, 32(2), 266–283.
- Kousha, K., & Thelwall, M. (2008). Sources of Google Scholar citations outside the Science Citation Index: A comparison between four science disciplines. *Scientometrics*, 74, 273–294.
- Lim, A., Ma, H., Wen, Q., Xu, Z., Cheang, B., Tan, B., et al. (2007). Journal-Ranking.com: An online interactive journal ranking system. *Proceedings of the National Conference on Artificial Intelligence*, 22(2), 1723–1729.
- Meho, L. I., & Yang, K. (2007). Impact of data sources on citation counts and rankings of LIS Faculty: Web of Science versus Scopus and Google Scholar. *Journal of the American Society for Information Science and Technology*, 58(13), 2105–2125.
- Moed, H. F. (2005). Citation analysis of scientific journals and journal impact measures. *Current Science*, 89, 1990–1996.
- Moed, H. F., van Leeuwen, T. N., & Reeditijk, J. (1999). Towards appropriate indicators of journal impact. *Scientometrics*, 46, 575–589.
- Noruzi, A. (2005). Google Scholar: The new generation of citation indexes. *Libri*, 55, 170–180.
- Olden, J. D. (2007). How do ecological journals stack-up? Ranking of scientific quality according to the *h*-index. *Ecoscience*, 14(3), 370–376.
- Oppenheim, C. (2006). Using the *h*-index to rank influential British researchers in information science and librarianship. *Journal of the American Society for Information Science and Technology*, 58(2), 297–301.
- Pauly, D., & Stergiou, K. I. (2005). Equivalence of results from two citation analyses: Thomson ISI's Citation Index and Google's Scholar service. *Ethics in Science and Environmental Politics*, 33–35.
- Prathap, G. (2006). Hirsch-type indices for ranking institutions' scientific research output. *Current Science*, 91(11), 1439.
- Rousseau, R. (2007). The influence of missing publications on the Hirsch index. *Journal of Informetrics*, 1, 2–7.
- Saha, S., Saint, S., & Christakis, D. A. (2003). Impact factor: A valid measure of journal quality? *Journal of the Medical Library Association*, 91, 42–46.
- Schreiber, M. (2007). A case study of the Hirsch index for 26 non-prominent physicists. *Annalen der Physik*, 16(9), 640–652.
- Schubert, A., & Glänzel, W. (2007). A systematic analysis of Hirsch-type indices for journals. *Journal of Informetrics*, 1(3), 179–184.
- Smith, A. G. (2008). Benchmarking Google Scholar with the New Zealand PBRF research assessment exercise. *Scientometrics*, 74(2), 309–316.
- Vanclay, J. K. (2007). On the robustness of the *h*-index. *Journal of the American Society for Information Science and Technology*, 58(10), 1547–1550.
- Vanclay, J. K. (in press). Bias in the Journal Impact Factor. *Scientometrics* 78(1), doi:10.1007/s11192-008-1778-4.
- van Leeuwen, T. N., Moed, H. F., & Reeditijk, J. (1999). Critical comments on Institute for Scientific Information impact factors: A sample of inorganic molecular chemistry journals. *Journal of Information Science*, 25(6), 489–498.
- van Raan, A. F. J. (2006). Comparison of the Hirsch-index with standard bibliometric indicators and with peer judgment for 147 chemistry research groups. *Scientometrics*, 67, 491–502.
- Walter, G., Bloch, S., Hunt, G., & Fisher, K. (2003). Counting on citations: A flawed way to measure quality. *The Medical Journal of Australia*, 178, 280–281.
- Weale, A., Bailey, M., & Lear, P. (2004). The level of non-citation of articles within a journal as a measure of quality: A comparison to the impact factor. *BMC Medical Research Methodology*, 4, 14.