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Ranking forestry journals using the *h*-index

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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.

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.

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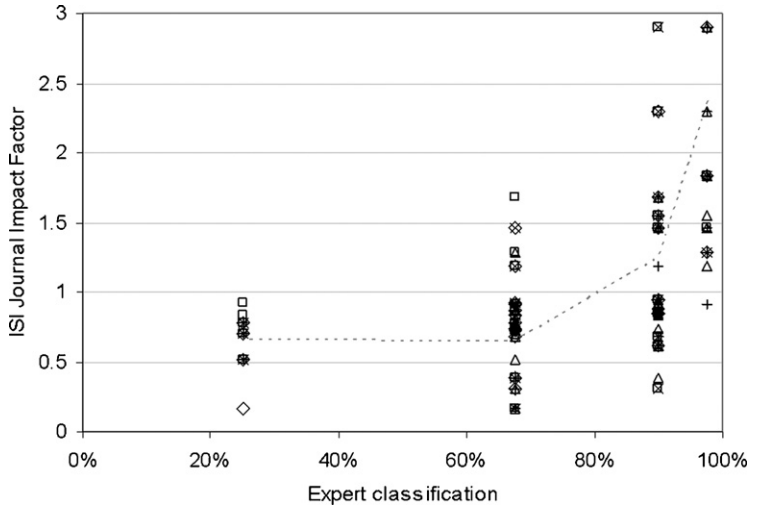

Fig. 1. Journal Impact Factors contrasted with an expert classification of 27 forestry journals by four individuals into four classes (using different symbols for each expert).

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 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