Mapping the International Representation of the Botanical Survey of India

Kalyani M E ***A Bagavathi***

Abstract

Botanical Survey of India (BSI) is the pioneer in the field of Indian Plant Taxonomy. Its core activity is the exploration and identification of national plant resources. The basics of all biotechnology related fields rely on the proper exploration and identification of the natural resources. In this concern, it is necessary to assess the research contribution of this highly privileged national institute in terms of undergoing a comparison between the two international citation databases. The Scopus and Web of Science (WoS) were the citation databases used in determining the international coverage of the research output of BSI. The results retrieved from those databases were studied in different aspects of scientometric variables such as total population count, citations count, prolific journals and articles. Also, prolific authors based on number of publications, citations received and h-index were taken into account. Additionally, a divergence prevailed in the coverage of citation databases with the institutional repository were also analyzed. After analyzing the databases in various aspects the findings have been registered. Suggestions have been given from the findings for the future improvements of coverage of research contribution in the international citation database from Botanical Survey of India.

Keywords: Bibliometrics, Scientometrics, Institutional Repositories, National Knowledge Infrastructure, Citation Analysis, Citation Databases, Research Evaluation, Botanical Survey of India etc.

1. Introduction

Scientometric studies based on the international citation databases for the analyses of the research trends are quite useful for the subject areas where the research is already experiencing with the information explosion and to those geographical regions whose coverage in such databases is high. Still, there are some basic research areas such as Plant taxonomy which contributes the fundamental knowledge on the plant species with wider applications, compels intensive coverage in the international databases.

Already, scientific community of Botanical Survey of India (BSI) and researchers were concern over the impact factor based assessment for those underprivileged regional/national oriented subject fields and expecting innovative contribution based index. In one of the research communication (Pathak and Bharati, 2014) the Scientometric analysis of Botanical Survey of India based on the Web of Science was discussed. Venu (2014), Scientist of BSI expressed his opinion about the article that the research contribution of disadvantaged subject fields such as plant taxonomy was not comprehensively covered in the international citation databases. This kind of hot disputes paved the way to develop the institutional repository and led to compare the actual research output of the institution under study, with the well known international citation databases such as Scopus and Web of Science (WoS).

2. Objective of the Study

1. To compare the international citation index databases with the actual out put of the institution.

2. To provide the prolific journal and article list in the field of Plant Taxonomy

3. To specify the list of highly prolific authors.

4. To prove the need of developing institutional research output and strong documentation unit with the inbuilt monitoring facility to support the national knowledge infrastructure and for the independent research evaluation.

5. To emphasis the need of including the institutional research media (journal) into the international abstract databases in this electronic era for the wider dissemination of the research contribution.

3. Methodology

The citation databases under consideration say Scopus and Web of Science were searched with the term "Botanical Survey of India". The corpus was transferred to the MS Excel for data normalisation and the same was carefully scrutinized. The study covered the period of 34 years (1980 – 2014). The research contribution from one of the BSI regional centre was taken for the scientometric study. The collected data was tabulated and presented in tables, which are analysed to draw inferences and findings.

4. Analysis and Major Findings

The corpus of the analysis constitutes the publication count and citation count obtained from the Scopus and WoS. The citations received were analysed and compared in all the angles to give a clear position of the citation databases. Further, the data were associated with the institutional repository to prove the importance of developing a strong documentation unit having database to disseminate the research contribution with an inbuilt feature of assessing the contribution index.

4.1. Total Publication and Citation Count of BSI

The total number of publications, total citation count, average citations per item and h-index are the variables considered in the table-1. Even though the index databases covered the publication starting from 1980 to 2014, the citations were available only from 1996.

Table 1: Total Publication and Citation Count of BSI

Details	Scopus	Web of Science
Number of Publications (1980 – 2014)	605	347
Sum of the Times Cited (Since 1996)	1394	837
Average Citations per Item	2.3	2.41
H - index	17	14

The table-1 shows that the Scopus coverage is 605 while the WoS yields only 347 records pertaining to BSI. The total sum of citations received in Scopus is 1394 and an average citation per item is 2.3 with h-index of 17. Similarly in WoS BSI has received 837 citations at an average of 2.41 with h-index of 14. The study shows that from the year 2009 onwards, the publication count has increased in both the citation databases.

4.2. Contribution of Botanical Survey of India, Southern Regional Centre (BSISRC)

Table 2 discusses the total publication count of BSI and BSISRC on the Scopus and WoS with its percentage of coverage.

Table 2:Publication Contribution of BSISRC

Database	BSI	BSISRC	Percentage of Contribution
Scopus	605	46	7.6%
Web of Science	347	64	18.44%

BSISRC is one of the twelve research centre of Botanical Survey of India, which supports 7.6% & 18.44% of the whole BSI research output as of Scopus and WoS respectively is taken as the sample. The interpretation and concepts based on this sample is understood to entirety of BSI contribution. As far as citations received, the BSISRC were in the range of 9 – 11%. The table-2 states that 46 articles out of 605 articles covered in Scopus belong to BSISRC while in the WoS the coverage is 64 out of 347 articles.

The below table discusses about citation and h-Index comparison of BSI and BSISRC.

Table 3: Citation Contribution of BSISRC

Citations Count and Index	BSI	BSISRC	Percentage
Scopus Citation	1394	138	9.899
Scopus h- index	17	6	-
Web of Science Citation	837	93	11.1
Web of Science h- index	14	5	-

In respect of citations concern the table-3 reveals that 138 citations of 1394 on the Scopus database belongs to BSISRC and that of WoS provided 93 citations out of 837 total citations.

H – Index of the BSI citations is 17 and 14 in the Scopus and WoS respectively. But, BSISRC possessed 6 and 5 h-index from the Scopus and WoS.

4.3. Comparison of Scopus, WoS and Institutional Repository

The main purpose of this study is to compare the publication count of BSISRC retrieved from the databases Scopus, WoS with the Institutional repository. It is observed that during 1980's BSI involved in documenting its 30 years of research exploration to its research community through peer reviewed and nationalized journals. The proportion of coverage in the two citation databases with the actual research output is stated in the table-4.

Table 4: Comparison of BSISRC Contribution with the Institutional Repository

Databases	Total Publication count	Percentage
Scopus	46	7.6%
Web of Science	64	10.61%
Institutional Repository	603	100%

From the above table it is found that BSISRC has 603 publications on it repository of BSI contribution. It is found that out of the above 603 publications Scopus has 46 publication counts and WoS has 64 publication counts. Hence from the above it is understood that 7.6% has been represented in Scopus and 10.61% has been represented in WoS out of the 603 institutional repository publication of BSISRC. The above illustrates that only 1/10th of the publications are represented in these international databases.

The table-4 illustrates that the preference of Scientists to disseminate their ideas in the nationalized media such as Bulletin of the Botanical Survey of India, Journal of Economic and Taxonomic Botany as shown in the table-5 minimal representations in the international databases. In early 1980 & 1990s the research community has less privilege in accessing the foreign resources, Currently the situation has improved due to the penetration of electronic databases. In this regard, it is the responsibility of the institute to make its research media "Bulletin of the Botanical Survey of India" to get covered in the international indexing databases.

Table 5: Top 5 Journals Preferred by BSISRC

Database	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Scopus	Nordic Journal of Botany	Kew Bulletin	Proceedings of the Plant Sciences	Aquatic Botany	Mycotaxon
Web of Science	Nordic Journal of Botany	Mycotaxon	Taxon	Current Science	Nova Hedwigia
Institutional Repository	Journal of Economic and Taxonomic Botany (India)	Bulletin of the Botanical Survey of India	Journal of Bombay Natural History Society	Indian Journal of Forestry	Rheedea (India)

The table-5 states the ranking of various journals based on the preference exposed by scientific community of BSISRC in disseminating their research exploration. Both in Scopus and WoS, the Nordic Journal of Botany holds the first position, and it does not find place the top 5 Positions in the institutional repository. From the above it is found that journal "Current Science" is the only national journal available in the above databases. All other journals stated in the above table namely Nordic Journal of Botany, Kew Bulletin, Proceedings of the Plant Sciences, Aquatic Botany, Mycotaxon, Taxon, Nova Hedwigia were foreign journals. With respect to the institutional repository database, the top five position are held by Indian Journals published by learned societies.

4.4. Citations Based Metric Evaluation

This citations based metric evaluation completely deals with the citations received by the research articles and the authors of the BSISRC. The results retrieved out of the Scopus and WoS is compared in light of the citations obtained.

4.4.1 Highly Cited Articles

Table-6 exhibits the top 5 articles retrieved from Scopus based on its total citation count. Position of the article, Title of the article, Authors involved, Name of the Journal and the Number of Citations are the details of the caption provided in the table-6. Table-7 shows the same sort of details pertaining to the top 5 articles retrieved from WoS. These two tables were compared to derive an inference.

Table 6: Top 5 Highly Cited Articles based Scopus

Rank	Title of the Article	Authors	Journal	Citations
1.	Floral biology and ecology of Halophila beccarii Aschers. (Hydrocharitaceae)	Parthasarathy N., Ravikumar K., Ramamurthy K.	Aquatic Botany	10
2.	Distribution of seagrasses along the coast of Tamil Nadu, southern India	Parthasarathy N., Ravikumar K., Ganesan R., Ramamurthy K.	Aquatic Botany	9
3.	Halophila decipiens Ostenf. in Southern India	Parthasarathy N., Ravikumar K., Ramamurthy K.	Aquatic Botany	7
4.	Some foliicolous fungi from Southern India	Hosagoudar V.B., Goos R.D.	Mycotaxon	6
5.	Synopsis of the genus Ficus L. (Moraceae) in India	Chaudhary L.B., Sudhakar J.V., Kumar A., Bajpai O., Tiwari R., Murthy G.V.S.	Taiwania	5

From the above table Two articles had find place in the top 5 positions of both the databases. It is found that Cryptogamic botany related articles and the journal have entered into this prolific article group. The table-6 and 7 discusses about the prolific articles with their citation counts and the name of the journal it is published. It is observed that the journal "Aquatic Botany" played a major role in Scopus database and "Mycotaxon" holds the significant position in WoS. Interestingly, it should be noted that both the journals were covered by Scopus as well as WoS.

Table 7: Top 5 Highly Cited Articles based on Web of Science

Rank	Title of the Article	Authors	Journal in which appeared	Citations received
1.	Some foliicolous fungi from southern India	Hosagoudar, VB; Goos, RD	Mycotaxon	8
2.	Meliolaceous fungi from the state of Kerala, India	Hosagoudar, VB; Goos, RD	Mycotaxon	7
3.	Distribution of Seagrasses along the coast of Tamil Nadu, Southern India	Parthasarathy N, Ravikumar K, Ganesan R, Ramamurthy K	Aquatic Botany	6
4.	Some Asterina species from Southern India	Hosagoudar, VB; Balakrishnan, NP; Goos, RD	Mycotaxon	5
5.	Pratapraiella, a new genus of the family Meliolaceae	Hosagoudar, VB	Nova Hedwigia	4

The articles "Some foliicolous fungi from southern India" and "Distribution of seagrasses along the coast of Tamil Nadu, southern India" holds the significant position in both the citation databases. All other articles specified in both the tables 6 & 7, except the article "Synopsis of the genus Ficus L. (Moraceae) in India" from Table 6 are published by "Cryptogamic Botany". From the tables (6) & (7) it is evident that "Molecular taxonomy" journals has more representation than journals on Macro Plant Taxonomy.

4.4.2 Prolific Authors of BSISRC

The below Three tables discusses about the authors productive based on the publication count and citation impact. The top 5 positions of the authors were provided with their names.

4.4.2.1 Prolific Authors based on Publication Count

The table-8 shows the list of five highly productive authors based on the total publications details obtained from Scopus, WoS and the Institutional repository. The number of publications was specified within the parenthesis.

Table 8: Top 5 Prolific Authors based on Publication Count

Rank	Scopus	Web of Science	Institutional Repository
1.	Murthy GVS (7 publications)	Hosagoudar VB (23)	Nair V J (77)
2.	Balakrishnan NP, Nair VJ & Nair NC (each 6 publications)	Daniel P (9)	Daniel P (75)
3.	Daniel P & Gnanasekaran G (each 5 publications)	Balakrishnan NP (6)	Nair NC (55)
4.	Gopalan R, Murugan C & Ramamurthy K (each 4 publications)	Murugan C (5)	Henry AN (48)
5.	Hosagoudar VB, Kaliamurthy S & Kabeer KAA (each 3 publications)	Murthy GVS & Palanisamy M (each 4)	Murthy GVS (43)

Daniel P, Balakrishnan NP and Murthy GVS were consistently finding place in the top 5 position of all the three databases under evaluation. The top publication count as of Scopus is 7 publications and 23 in the WoS. From the developed institutional repository it was observed that Dr.V.J.Nair has published 77 articles and stands the first place. In the second position, the authors Balakrishnan NP, Nair VJ & Nair NC were having 6 publications each in the Scopus. In WoS and Institutional Repository, Daniel P holds the second position with 9 and 75 publications respectively. The third position based on publication count in Scopus, WoS and Institutional Repository was occupied by Daniel P, Gnanasekaran G, Balakrishnan NP and Nair NC. Gopalan R, Murugan C, Ramamurthy K, Henry AN were the

authors holding the fourth position. The table 8 shows that Hosagoudar VB, Kaliamurthy S, Kabeer KAA, Murthy GVS were in the fifth position.

4.4.2.2 Prolific Authors based on Citation Impact

The highest number of citations with the H-index received by the top 5 prolific authors from Scopus and WoS were listed based on their rank position in the Table-9 and Table-10 respectively.

Table 9: Top 5 Prolific Authors based on Scopus Citation impact

S.No.	Name of the Author	Citations Received	Scopus-H index
1.	Ramamurthy K	23	3
2.	Murthy GVS	10	2
3.	Nair NC	8	2
4.	Sudhakar JV	6	1
5.	Balakrishnan NP	5	1

The author Ramamurthy K has obtained 23 citations followed by Murthy GVS with 10 citations. The highest score of 3 h-index was obtained by the top ranked author. Based on citation count, the author Nair NC who received 8 citations and 2 h-index is in the third position. Although, the authors Sudhakar JV and Balakrishnan NP were having h-index one, the citation count of them have determined their fourth and fifth position.

Table 10: Top 5 Prolific Authors based on Web of Science Citation impact

S.No.	Name of the Author	Citations Received	WoS-H index
1.	Hosagoudar VB	54	4
2.	Balakrishnan NP	8	2
3.	Ramamurthy K	7	2
4.	Palanisamy M	6	2
5.	Daniel P	4	2

In table 10, the author Hosagoudar VB who holds first position has received 54 citations in the WoS with 4 h-index followed by Balakrishnan NP with 8 citations. Except first position author all others namely Balakrishnan NP, Ramamurthy K, Palanisamy M and DanielP have obtained 2 h-index each.

Interestingly, the two authors Ramamurthy K and Balakrishnan NP have achieved to find place in both the citation databases. The highest citations received are 23 in the Scopus with 3 h-index. BSISRC has received 54 citations and 4 h-index in the WoS. Out of 138 total citations received by BSISRC in Scopus, and out of 93 total citations received by BSISRC in WoS, the top positioned article (rank 1) in the table yields 16% and 58% respectively.

5. Discussion and Suggestion

As the half life year is more (Price, 1965) in the taxonomic field, it is necessary to take step to get the journal say Bulletin of the Botanical Survey of India indexed in the world class abstract databases for example BIOSIS Preview, CAB Abstract. With this improvement, the publications would reach a wider research community for long term.

Additionally, the organization should fund its departmental library in developing the institutional repositories. The citations received through the abstract databases and the citation indexed databases will certainly invite the research community to approach the institution for the supply of information that can be met using the institutional repository which was developed.

The monitoring records in the institutional website showing the number of hits for the articles in the repository facilitates the sponsoring body to get the real impact factors and further altmetrics. As data-

bases drawn from systematic biology were often utilized by a wide range of users, those are the life time achievements of scientists, but go unacknowledged. This should be overcome by the inbuilt acknowledgment feature of monitoring the information usage.

Apart from the institutional repository, a strong documentation unit of capturing entire research contribution on the particular subject field will support the research as well as in performing the contribution index. This performance/ contribution index is a boon for those research areas such as taxonomy, survey and other areas of nationalized subject fields. Good documentation work of taxonomy throw light on the gaps in the species classification thus provides path for the conservationists to decide on its work related to protection of natural resources. These types of researches contribute to the nation concerned in long run but not to the international research community. To push the frontiers of knowledge further, it is necessary to have the correct demarcation of the existing knowledge.

6. Conclusion

The result of this study has shown differences in the coverage of the databases. It compels the research evaluators to rely on additional contribution index for research assessment. Suggestion of developing institutional repository with inbuilt feature of self calculating h-index based on the number of hits received by such developed database will contribute much more reliable research evaluation for those kinds of nationalized subjects. This is the attempt of proving the need for constructing a robust knowledge infrastructure at the national level in support of the recommendations of national knowledge commission. Despite the fact of coverage in the citation databases it is highly recommended to bring the online version of the journals say Bulletin of the Botanical Survey of India and to focus on their inclusion in the international indexing databases to reach wider research community.

References

1. Ball, R. & Tunger, T. (2006). Science indicators revisited – Science Citation Index versus SCOPUS: A bibliometric comparison of both citation databases. Information Services & Use, 26, 293–301.
2. Bar-Ilan, J., Levene, M., & Lin, A. (2007). Some measures for comparing citation databases. Journal of Informetrics, 1(1), 26-34.
3. Bartol, T., Budimir, G., Dekleva-Smrekar, D., Pusnik, M., & Juznic, P. (2014). Assessment of research fields in Scopus and Web of Science from the viewpoint of national research evaluation in Slovenia. Scientometrics, 98(2), 1491-1504.
4. Chirici, G. (2012). Assessing the scientific productivity of Italian forest researchers using the Web of Science, SCOPUS and SCIMAGO databases. iForest - Biogeosciences and Forestry, 5(3), 101–107.
5. Chou, P. N. (2012). A comparison study of impact factor in Web of Science and Scopus databases for Engineering Education and Educational Technology Journals. Issues in Informing Science and Information Technology, 9, 187-194.
6. Franceschet, M. (2009). A comparison of bibliometric indicators for computer science scholars and journals on web of science and

google scholar. Scientometrics, 83(1). Available at http://dx.doi.org/10.1007/s11192-009-0021-2.

7. Jacso, P. (2009). Errors of omission and their implications for computing scientometric measures in evaluating the publishing productivity and impact of countries. Online Information Review, 33(2), 376–385.

8. Kousha, K.., & Thelwall, M. (2008). Sources of Google Scholar citations outside the Science Citation Index: a comparison between four science disciplines. Scientometrics, 74(2): 273-274.

9. Lopez-Illescas, C., Moya Anegon (de), F., & Moed, H. F. (2009). Comparing Bibliometric Country-by-Country Rankings Derived from the Web of Science and Scopus: The Effect of Poorly Cited Journals in Oncology. Journal of Information Science, 35(2), 244–256.

10. Pathak, M. & Bharati, K. A. (2014). Botanical Survey of India (1971 – 2010): a scientometric analysis. Current Science, 106(7), 964-971.

11. Prathap, G. (2013). Benchmarking research performance of the IITs using Web of Science and Scopus bibliometric databases. Current Science, 105(8), 1134-1138.

12. Price, Derek J.de Solla (1965). Networks of scientific papers: The pattern of bibliographic references indicates the nature of the scientific research front. Science, 149(3683), 510-515.

13. Venu, P., & Sanjappa, M. (2014). Some observations on a report on scientometric analysis on Botanical Survey of India. Current Science, 107(7), 1103-1104.

14. Walton, C. J., & Morris, A. (2013). A bibliometric study of taxonomic botany. Journal of Documentation, 69(3), 435–451.

15. Whitley, K. M. (2002). Analysis of SciFinder Scholar and Web of Science citation searches. Journal of the American Society for Information Science and Technology, 53(14):1210{1215.

About Authors

Ms. Kalyani M E, Senior Library & Information Assistant, Botanical Survey of India, SRC, Coimbatore.
Email: medurelumalaikalyani@gmail.com

Dr. A Bagavathi
University Assistant Librarian, The Tamil Nadu Dr Ambedkar Law University, Chennai.
Email:bagavathiaru@yahoo.com