Original Article

Indian Journal of Library and Information Science
Volume 16 Number 3, September – December 2022
DOI: http://dx.doi.org/10.21088/ijlis.0973.9548.16322.2

What Botanists Tend to Cite?

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How to cite this article:
Anil Kumar Dhiman, Hafeezur Rehman/What Botanists tend to Cite?/Indian J Lib Inf Sci 2022;16(3):173–183.

Abstract

Citations are the documents which are referred in writing any research paper, article or the scholarly publication. They show interlinking with the articles which is being written by an author (s) and they are considered as the formal source to any research paper or the articles. Citation studies are used to ascertain various objectives, such as the most cited author, books, edited books and the journals etc. They also help in developing the collection of any library in any particular discipline. The present study is carried out to ascertain that what are the major sources of information in Botany discipline and what the Botanists tend to cite. This study further will be useful in developing library collection in Botany subject.

Keywords: Citations; Citation Study; Botany; Ranked Lists.

INTRODUCTION

Citations are the documents which are referred and quoted by the author for his writing. These are the formal sources to a published or unpublished source that have been consulted and used in obtaining information from while writing a research paper, article or the scholarly publication. Citations occupy an integral part of all kinds of research articles and are considered as the key elements of citation analysis studies. The primary function of citations is to provide a connection between two documents, one which cites and the other which is cited. Mahapatra[1] has listed possible reasons of giving citations as under:

- Giving credit for related work
- Providing background reading
- Correcting one's own work and the work of others
- Providing leads to poorly disseminated, poorly indexed or united work
- Authenticating data and classes of fact – physical constants etc.
- Identifying original publications in which an idea or concept was discussed
- Identifying original publications or other work describing an eponymic concept or the term

Thus, there are many uses and reasons for giving citations in an article or research paper or the scholarly publication.

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Received on: 29.03.2022

Accepted on: 30.04.2022

NEED OF THE STUDY

Citation analysis is one of the most important techniques of the bibliometric study of literature based upon some degree of relationship between citing and cited articles or documents. On the basis of citation studies, one can ascertain what the authors tend to cite, whether the books, journals, or other documents and now a day, including web documents. Further, the obsolescence and half-life of the documents can also be ascertained using citation studies.

Thus, citation analysis gives an idea insight into dynamics of subject under consideration. So, better organisation of literature consequently becomes possible. Citation studies have been so far confined to well established subject areas but no comprehensive study seem to be carried out for the botany subject as seen through review of the literature in recent past. Thus, what the Botanists tend to cite and use which types of the literature is studied in present research paper.

REVIEW OF LITERATURE

A bibliometric study on Indian Botanists was carried out by Dhiman and Rani[2] that was based on the Journal of Indian Botanical Society, one of the oldest journals in the field of Botany and its five years' issues for the duration 1997-2001 were studied. It was revealed from the study that maximum contributions came from universities which account 72.46 percent of the total contributions. It was followed by the colleges and research institutes which constitute 17.68 and 7.82 percent of the total contributions respectively. Single authored papers constituted only 17.4 percent of the total contributions. There is also seen an increase in collaborative research as the concept of multi-authorship is on the increase, multi-authored papers constitute 82.6 percent of the total authorship production. A trend of multiple authorship contributions with 5-authored papers was also seen, which means the research/projects are being carried out in more collaboration. It was also seen that there was no consistency in the distributions of the articles as they range from 43 to 72, which means the difference of contributions is about 19. However, all the contributions were from Indian authors except for one article which came from Utah.

Nongrang and Tariang[3] have conducted a study for research output of botany faculties to manage journal collection in North Eastern Hill University library using data from two citation index databases, namely, ISI Web of Science (WOS) Database and Google Scholar. A total of 1218 articles published in 263 journals were collected from Web of Science (WoS) via Science Citation Index to study the number of publications by botany faculty members of NEHU, nature of authorship pattern, author productivity and identification of core journals in the field of Botany. The results of the study show that the nature of growth literature is not consistent as the number of publications varies in nature; however, the highest number of publications was in the year 2009 to 2010 which account for 24 (15.58 per cent) out of 154 publications. Further, three-authored papers numbering 61 (39.61 per cent) top the list in ten years. However, 22 authors received one citation each and again 22 authors received two citations; thus, the observed percentage of authors varied from the expected percentage of authors as predicted by applying Lotka's equation. Bradford's law of distribution was used to identify the core journals according to the relationship between the zone is 1: n: n^2 (i.e. 1: 5: 25), but the relationship between the zones in the present study is contradictory in each as 11: 53: 199 which does not fit into Bradford's distribution.

Sab, Kumar and Biradar[4] have conducted a citation study for Annals of Library & Information Studies published during 2007 to 2010. It examines year wise, institutions wise, state wise distribution of contributions, authorship pattern, citation analysis, length of the contributions etc. It is seen in the study that most of the contributions of this journal are contributed by single author and state wise distribution shows that most of the contributions are contributed from New Delhi. Citation analysis of 2562 citations includes the study for average number of citations per contribution, types of publications cited and preparing the ranked list of cited journals in contributions of this journal. The study reveals that journals are the most cited publication amongst the library and information scientists and the source journal i.e., Annals of Library and Information Studies is the most cited journal among total contributions of this journal.

Biswas, Roy and Sen[5] have carried out a study with 358 original contributions published in the journal "Economic Botany" during 1994-2003. It is seen that the contributions by single author and small teams comprising two or three authors account for about 80% of the papers. Books among the citations accounted for 59 percent and articles 41 percent. Further, e-citations started appearing from 1998 but their number still are negligible. The length of maximum number of articles (38%)

ranges from six to 10 pages. Articles occupying 11 to 15 pages rank next accounting for 31%. The highest number of articles totalling 217 (60.61%) has emanated from academic institutions such as universities. Further, it is noted that the authors from 45 countries have contributed their articles, wherein, the first four countries are responsible for 51.7%, the first ten countries for 67.8%, and the first 15 countries for 78.6% of the articles. Besides, the charts, diagrams, photos and tables included in the articles total 396, 427, 859 and 925 respectively.

Dhiman and Singh[6] have conducted a bibliometric study for the Granthalaya Vigyan that is the only long survived Hindi language journal in the field of library science. An analysis of 140 papers published in the five volumes of the Granthalaya Vigyan during the period 2016 to 2020 were taken into consideration. The results of the study discuss the year-and volume-wise number of articles, authorship pattern, most productive authors of the journal, state-wise contribution of the articles, average length of the articles, types of sources used, and the number of references per article. Besides, the subject fields of the articles published in the last five years are also analysed to understand the trends of the research being published in the journal.

SOURCE JOURNAL

Bulletin of Pure and Applied Sciences: Section-B-Botany is devoted to the international advancement of organized knowledge on all aspects of Botany. It is a well-known indexed scientific journal dedicated to publish high quality original research in the field of plant sciences. Scope of the journal includes cell and molecular biology, ecology, conservation biology and biodiversity, mycology and plant pathology, phycology, physiology and biochemistry, structure and development, systematics, phytogeography and paleobotany. ecology, taxonomy, plant morphology, anatomy, palynology, paleopalynology plant diversity and evolution. It provides a forum for comments by publishing original research contributions, scientific survey, case studies, book review etc. Bulletin of Pure and Applied Sciences Section-B-Botany is issued six monthly, i.e. June and December of every year and is copyrighted. So, the manuscripts published in the Bulletin cannot be reproduced without the written permission of the Editor-in-Chief (https://www.bpasjournals.com/botany/).

The present study is limited to only 39th volume of Bulletin of Pure & Applied Sciences: Section B for Botany published in the year 2020. It has 02 issued published in June and December in 2020.

OBJECTIVES OF THE STUDY

The following objectives are framed for the study in present problem.

- To know year wise distribution of citations
- To know the language wise distribution of citations
- To know the authorship patterns from citations
- To know the chronology of materials based on the citations
- To know the obsolescence of documents including, books edited books, proceedings/reports, Ph.D./Master Theses, web documents and other documents, and
- To prepare the ranked list of the authors, journals, books and that of edited books.

RESEARCH METHODOLOGY

Volume 39th (2020) of the Bulletin of Pure and Applied Science Section-B (Botany) was chosen for study of citations. Taking the citations in consideration a detailed study is made and the systematic data were tabulated for different citations consisting of the journal, publisher, author, editor, books and websites etc. The references were categorized according to format or genre, i.e., book, journal, report, conference proceedings, theses/ dissertations, and reference books etc.

Later, the references were enter/noted down in MS-Excel and data analysis was done. Then, the results were presented as per the objectives framed for the study.

DATA TABULATION AND ANALYSIS

The data tabulation and their analysis was done as per the objectives framed for the study. The results are presented in tabular format as well as in graphical form wherever seem necessary.

Year wise Distribution of Citations

The distribution of citations on the basis of the different bibliographic from may be seen in the Table 1 Citations were divided into various categories viz., journals, books, conference paper, web resources, theses and dissertations and miscellaneous consisting of the patents, personal communications, product literature, software and software manuals, university extension documents, unpublished materials etc.

Table 1 depicts the analysis of the data for year wise distribution of the citations which indicates that highest citations are from journals. Out of the total number of 394 citations, 255 (64.72%) are from journals, followed by 90 books (22.84%), 12 theses/ dissertations (3.04%), 05 reports (1.26%). The type of "Others" includes database, databank, manual, unpublished work, patents, commentary, survey and research bulletin etc.

Table 1: Year wise Distribution of Citations (Vol. 39th)

Types of Material	Citation	Cumulation	Percentage	Cumulation
Journals	255	255	64.72	64.72
Book	90	345	22.84	87.56
Edited Books	15	360	3.80	91.36
Proceedings/Reports	5	365	1.26	92.62
Ph.D./Master Thesis	12	377	3.04	95.66
Web Documents	9	386	2.28	97.94
Others	8	394	2.03	99.97
Total	394	394	99.97	99.97=100

Language Wise Distribution of Citations

The analysis of language of the citation is used to transmit a subject literature, and as a guide to cover patterns as well as an indication of the foreign language problem likely to face by users.

Table 2 shows the language wise distribution of the citations for the vol. 39th. It is seen that English language is most preferred language of the Botanists. It is seen that out of 394 citations, 383 citations comprising of 97.20% are in English language. Further it may be seen that out of 383 English language citations, 248 are of journals, 88 of books and 13 are Edited books. Rest is contributed by Ph.D./Master theses, proceeding reports and web documents and other documents. Hindi could not contribute, while other language contributed 11 citations that constitute 2.77 percent.

Table 2: Language Wise Distribution of Citations (Vol. 39th)

Types of Material	English	Percentage	Hindi	Percentage	Others	Percentage
Journals	248	62.94	-	-	7	1.77
Books	88	22.33	-	-	2	0.50
Edited Books	13	3.29	–	–	2	0.50
Proceedings/ Reports	5	1.26	-	-	-	-
PhD. /Master Thesis	12	3.04	-	-	-	-
Web Documents	9	2.28	-	-	-	-
Others	8	2.03	-	-	-	-
Total	**383**	**97.20**	**-**	**-**	**11**	**2.77**

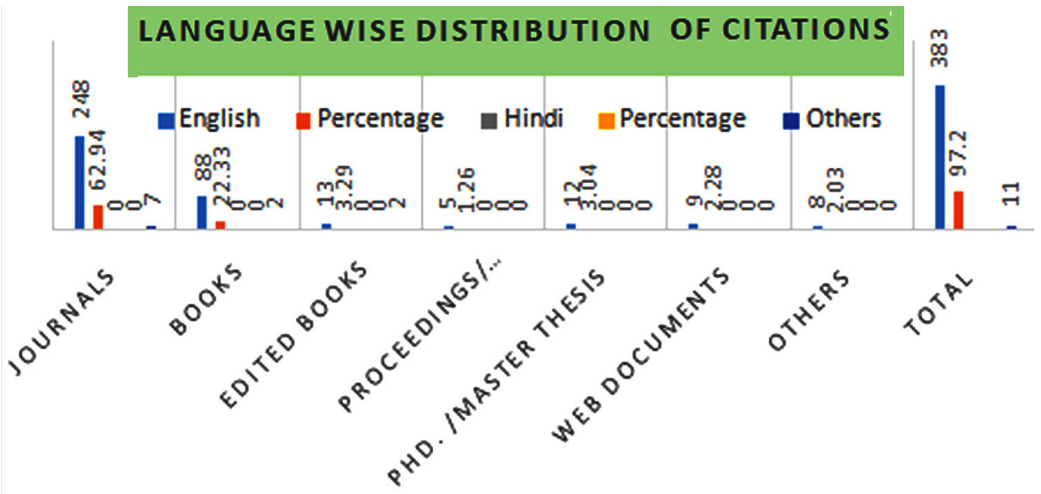

Fig. 1: Language Wise Distribution of Citations

Figure 1 also depicts the details of the languages used in writing the articles more clearly.

Authorship Patterns

The characteristics of any subject literature include not only the basic publishing patterns but that of the authors themselves. Therefore, the authors of the contribution were analysed to determine the percentage of single and multiple authors' papers.

The authorship pattern for the Vol. 39th shown in table 3 depicts that single author contribution was in 173 articles consisting of 43.86 percent followed by two authored papers, which account 86 numbers with 21.82 percent contribution and 37 consisting three authored papers with 9.37 percent contribution. Whereas, more than three authored or multiple authored articles were much more as compared to two authored that are 98 in numbers with 24.86 percent contribution.

Table 3: Authorship Patterns

Types of Material	Single Author	Percentage	Two Authors	Percentage	Three Authors	Percentage	Multiple Authors	Percentage
Journals	60	15.22	75	19.03	25	6.34	95	24.11
Books	72	18.27	8	2.03	8	2.03	2	0.50
Edited Books	10	2.53	3	0.76	2	0.50	-	-
Proceeding/								
Reports	5	1.26	-	-	-	-	-	-
PhD. /Master Theses	12	3.04	-	-	-	-	-	-
Web Documents	9	2.28	-	-	-	-	-	-
Others	5	1.26			2	0.50	1	0.25
Total	**173**	**43.86**	**86**	**21.82**	**37**	**9.37**	**98**	**24.86**

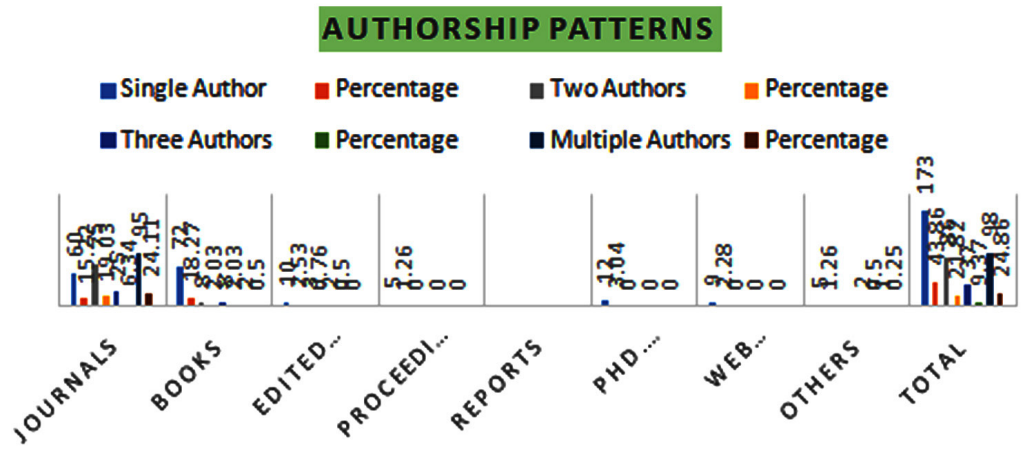

Fig. 2: Authorship Pattern

Authorship pattern is also shown more clearly in fig. 2.

Chronology of Materials

The chronology distribution, one of the characteristics of the cited documents which are frequently studied, is the age. Age distribution of citations and their analysis for a specific group of documents in a subject area reflect to a reasonable extent the usefulness of those materials which have been cited over a period of time. Age distribution of citations is used to determine various obsolescence factors related to the useful of life of materials. It can give an indication of how far a search must go back to obtain a represented sample of the published literature in a given field. This type of study also indicates the extent to which the researchers use the latest available literature in a particular field.

Table 4: Chronology of Materials

Years	Journals	Books	Edited Books	Proceedings/ Reports	Ph.D./ Master Theses	Web Documents	Others	Total
1961-1970	12	6	1	–	-	3	–	22
1971–1980	40	10	–	2	3	2	2	59
1981–1990	68	34	2	–	4	–	4	112
1991–2000	36	17	3	–	3	2	–	61
2001–2010	76	13	4	2	2	1	2	100
2011–2020	23	10	5	1	-	1	-	40

It may be seen from the table 4 that among the journals, maximum journals which are 68 in numbers come at first place that pertains to 1981-1990 duration, followed by 40 citations received for 1971-1980 duration and 36 citations for the duration 1991-2000. While, in case of books, maximum citations (340) are received for 1981-1990 duration which is followed by 17 numbers for 1991-2000 and 13 for 2001-2010 duration. If talk about for all materials, maximum used documents are from 1981-1990 which are 112 out of 394 citations. This is followed by 100 citations for the year 2011-2010. It means Botanists use maximum documents published during 1981-1990 duration.

Fig. 3 also depicts the chronology of different types of documents more clearly.

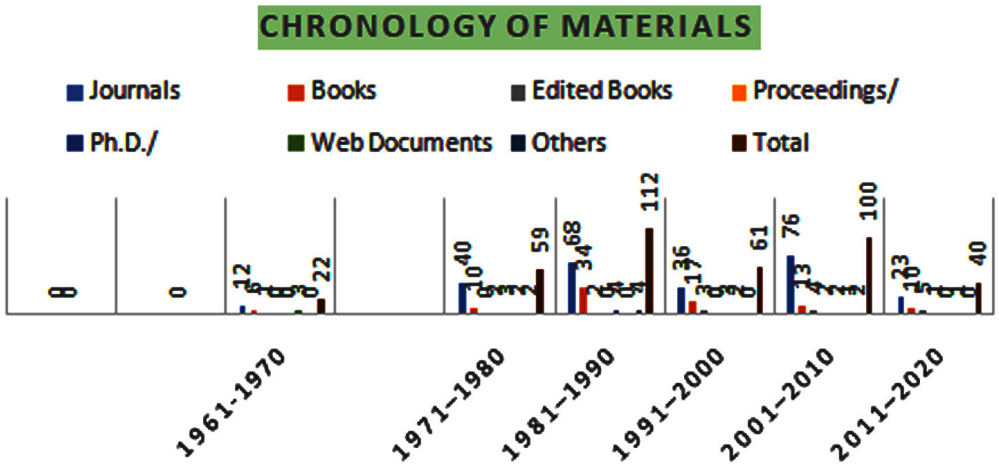

Fig. 3: Chronology of Materials

Obsolescence of Documents

Obsolescence means decreasing value of functional and physical assets or value of a product or facility from technological changes rather than deterioration. Thus, the analysis is also made to identify the obsolescence of literature. The study of obsolescence, in practical terms, is related to changes in the use of documents over the time.

Table 5A: Obsolescence of Journals

Years	No. of Citations	Percentage	Cumulative Citations	Cumulative Percentage
1- 10	12	4.70	12	4.70
11-20	40	15.68	52	20.38
21-30	68	26.66	120	47.04
31-40	36	14.11	156	61.15
41-50	76	29.80	232	90.95
51-60	23	9.01	255	99.96

Table 5 A shows that the maximum citations that counts for journal citations are 76 in number and they were received of 41-50 years of journal literature, followed by 21-30 years duration journals and 11-20 years duration journal literature respectively which account for 68 and 40 citations respectively.

Table 5B: Obsolescence of Books

Years	No. of Citations	Percentage	Cumulative Citations	Cumulative Percentage
1- 10	6	6.66	6	6.66
11-20	10	11.11	16	17.77
21-30	34	37.77	50	55.54
31-40	17	18.88	67	74.24
41-50	13	14.44	80	88.86
51-60	10	11.11	90	99.97

Further, the obsolescence of edited books for Vol. 39th is presented in table 5C. It shows that maximum citations that count to 5 in number were received of 51-60 years old edited books followed by 41-50 years duration of edited books and 31-40 years duration of edited books respectively which account for 4 and 3 citations respectively.

Table 5C: Obsolescence of Edited Books

Years	No. of Citations	Percentage	Cumulative Citations	Cumulative Percentage
1- 10	1	6.66	1	6.66
11-20	-	-	-	-
21-30	2	13.33	3	19.99
31-40	3	20.00	6	39.99
41-50	4	26.66	10	66.65
51-60	5	33.33	15	99.98

The obsolescence of proceedings/reports for Vol. 39th is presented in table 5-D. It shows that maximum citations that count to 2 in number were received of 11-20 years proceedings/reports followed by 41-50 years duration proceedings/ reports which account for 2 only. Only 1 citation respectively is received for 51-60 years.

Table 5D: Obsolescence of Proceedings/Reports

Years	No. of Citations	Percentage	Cumulative Citations	Cumulative Percentage
1- 10	-	-	-	-
11-20	2	40.00	2	40.00
21-30	-	-	-	-
31-40	-	-	-	-
41-50	2	40.00	4	80.00
51-60	1	20	5	100.00

The obsolescence of Ph.D./Master thesis for Vol. 39th is presented in table 5 E. It shows that maximum citations that counts to 4 in number were received of 21-30 years Ph.D./Master theses followed by 31-40 years duration Ph.D./Master theses and 11-20 years Ph.D./Master theses respectively which account for 3 and 3 citations respectively.

Table 5E: Obsolescence of Ph.D./Master Theses

Years	No. of Citations	Percentage	Cumulative Citations	Cumulative Percentage
1- 10	-	-	-	-
11-20	3	25.00	3	25.00
21-30	4	33.33	7	58.33
31-40	3	25.00	10	83.33
41-50	2	16.66	12	99.99
51-60	-	-	-	-

The obsolescence of Web documents for Vol. 39th is presented in table 5 F. It shows that maximum citations that count to 3 in number were received for 1-10 years. It is followed by 11-20 years duration and 31-40 years duration Web documents respectively which account for 2 and 2 citations respectively.

Table 5F: Obsolescence of Web Documents

Years	No. of Citations	Percentage	Cumulative Citations	Cumulative percentage
1- 10	3	33.33	3	33.33
11-20	2	22.22	5	55.55
21-30	-	-	-	-
31-40	2	22.22	7	77.77
41-50	1	11.11	8	88.88
51-60	1	11.11	9	99.99

Lastly, the obsolescence of other documents is presented in table 5G. The table shows that maximum citations that counts to 4 in number were received of 21-30 years. Other documents are followed by 11-20 years duration and 41-50 years duration respectively which account for 2 and 2 citations.

Table 5G: Obsolescence of Other Documents

Years	No. of Citations	Percentage Citations	Cumulative	Cumulative Percentage
1- 10	-	-	-	-
11-20	2	25	2	25
21-30	4	50	6	75
31-40	-	-	-	
41-50	2	25	8	100
51-60	-	-	-	-

Ranked Lists

The ranked lists in the bibliometric study are the list which are prepared on the basis of citation received in a particular time for specific literature. They are particularly developed to know the most cited journals and most cited authors in a specific subject knowledge. Besides, the most cited books, most cited edited books and most cited other documents can also be ascertained on the basis of ranked lists.

The authors are the important part in a system which are responsible for the generation of information, its communication and consumption. Thus, ranking studies of most productive authors determines the importance and strength of a particular publication as well as of its authors and at the same time indicates his potentiality in productivity.

Table 6A presents the author rank list based on two issues of Bulletin of Pure & Applied Sciences: Section – B for the year 2020. It is clear that Kayode, J. tops the list with 13 citations and Raina, A.K. comes to second followed by Hardborne, J. B. at third place with 4 citations.

Table 6A: Ranked List of Authors

S. No.	Rank	Name of the Author	Citations Received	Percentage
1	1	Kayode, J.	13	3.29
2	2	Raina, A.K.	6	1.52
3	3	Hardborne, J.B.	4	1.01
4	4	Singh, R.	4	1.01
5	5	Okwu, D.E.	3	0.76
6	6	Crane, E.	3	0.76
7	7	Carey, F.M.	1	0.25

The journals are essential type of documents for research. Their ranking list is a practical tool to help select journals of maximum utility in relation to their coverage of new and important literature in a particular subject area.

A rank list of most productive journals that is prepared on the basis of citations received in the articles in 2 issues of Bulletin of Pure & Applied Sciences: Section – B journal for the year 2020 show that Ethnobotany journal tops the list with 90 citations, and Journal of Economic & Taxonomic Botany comes to second position with 53 citations and Journal of Ethnopharmcacology on third position with 43 citations.

Table 6B: Ranked List of Journals

S. N.	Rank	Journal Name	Total	Percentage
1	1	Ethnobotany	90	35.29
2	2	Journal of Economic & Taxonomic Botany	53	20.78
3	3	Journal of Ethnopharmacology	43	16.86
4	4	Bulletin of Botanical Survey of India	33	12.94
5	5	Economic Botany	18	7.05
6	6	Bulletin of Medico– Ethnobotanical Research	11	4.31
7	7	Ancient Science of Life	7	2.74

It is also noted that the books form an important part of library collection. The rank list of the books used by any expert of the field tells the importance of the particular subject and how important is that subject and what are the most popular books that form a particular subject field. This rank list may be useful to develop a library collection or modifying its present collection in that particular subject. The analysis of ranking of books for the year 2020, is presented in table 6B.

Table 6C shows that Ethno-medicinal Assessment of Wild Edible Plants in Ijesa Region. Osun State, Nigeria 2018; Kayode,J.; Clinical Neurotoxicology, Brent Furbee; 2009 and Planting Herbs that attract Honey Bees, Ann Barczewski, 2015 capture the first three positions among ranked list of books.

Table 6C: Ranked List of Books

S. N.	Rank	Name of the Books/Author/Publishers	Citations	Percentage
1.	1	Ethno-medicinal Assessment of Wild Edible Plants in Ijesa Region. Osun State, Nigeria 2018; Kayode,J.	2	2.22
2.	2	Clinical Neurotoxicology, Brent Furbee;2009	2	2.22
3.	3	Planting Herbs that attract Honey Bees, Ann Barczewski, 2015	1	1.11
4.	4	Trees of Nigeria, Keay, R.W.J. 1989	1	1.11
5.	5	Introduction to Research on Plant Diseases. John Swift Co.Mc., Riker A.J. and Riker, R.S.1936. New York	1	1.11
6.	6	Study of Proline in Relation to Trees, Phytomorphology, Rajasthan. 1988.	1	1.11
7.	7	Pharmacognosy and Photochemistry Medicinal Plants. Lavoisier Publications. Bruneton J. France 1993.	1	1.11

Further, a rank list of most used edited books was also complied based on the citations received in the articles in Bulletin of Pure & Applied Sciences: Section B-Botany journal for its two issues published in the year 2020. Table 6D depicts the ranked list of edited books where the book "Phytochemical Methods", edited by Harborne J.B.; "Biotechnology in Agriculture and Forestry", edited by Skolmen, R.G. and "Anatomy of the Dicotyledons: Systematic Anatomy of Leaf and Stem with a Brief History of the Subject" edited by Metcalfe. and Chalk, L. tops the list with 2 citations each in both the issues.

Table 6D: Ranked List of Edited Books

S. N.	Rank	Name of Books	Citations	Percentage
1	1	Phytochemical Methods Edited by Harborne J.B. Chapman and Hall Ltd., London 1994.	2	13.3
2	1	Biotechnology in Agriculture and Forestry. Edited by Skolmen, R.G. Springer Verlag, Berlin 1986.	2	13.3
3	2	Anatomy of the Dicotyledons: Systematic Anatomy of Leaf and Stem with a Brief History of the Subject. Edited by Metcalfe. and Chalk, L. Clarendon Press Oxford; 1979.	2	13.3
4	4	Encyclopedia Britannica. Edited by Chisholm, Hugh Cambridge University Press,1911.	1	6.66
5	2	Pharmacognosy Edited by Trease, J and Evans, W.C. Saunders; London 2005	1	6.66
6	3	The Useful Plants of India Edited by Ambasta, S.P.; National Institute of Science Communication, New Delhi 2000.	1	6.66
7	3	The World's Beekeeping edited by Crane, E.U.S.A.1977	1	6.66
8	4	The Ayurvedic Pharmacopeia of India. Edited by A.P.I.2011.	1	6.66

Further, there are 05 books with 01 citations each which are cited by the Botanists while writing their articles / research papers in the journal.

MAJOR FINDINGS OF THE STUDY

The major findings of the study are:

- On the basis of the different bibliographic form cited in the Table 1, it is seen that 394 citations were there in 39th volume (2020) of the Bulletin of Pure & Applied Science; Section B journal in botany.
- Language wise distribution of the citations was reflected in table 2 show that language wise distribution of Vol. 39th (2020) possess a total citation out of 394 citations and 383 citations out of them comprising of 97.20% are in English language.
- It is seen from the data analysis that single author contribution is appeared in 173 article that is consisting of 43.86 percent followed by two authored papers, which account 86 numbers with 21.82 percent contribution and 24.86 percent is consisting of multiple authors which are 98 in numbers.
- Chronology distribution, one of the characteristics of the cited documents which are frequently studied, is the age. It is seen that maximum citations for the journals are from 2001-2010 decade; maximum books citations are from 1981-1990. If talk about for all materials, maximum used documents are from 1981-1990 which are 112 out of 394 citations. This is followed by 100 citations for the year 2011-2010. It means Botanists make maximum use of documents published during 1981-1990 duration.
- It is seen that total journal obsolescence in Vol. 39th (2020) shows that maximum citations that counts to 76 in number were received of 41-50 years. Further, maximum citations for books cited are 34 in number which were received of 21-30 years in Vol. 39th (2020). However, for edited books, maximum citations that counts to 5 in number were received for 51-60 years.
- Most cited author is Kayode J. who is at the top of ranking list of the authors. While, Ethnobotany journal is at the top in rank list of the journals with 90 cited references.
- It is also seen that Phytochemical Methods edited by Harborne J.B.; Biotechnology in Agriculture and Forestry, edited by Skolmen, R.G. and Anatomy of the Dicotyledons: Systematic Anatomy of Leaf and Stem with a Brief History of the Subject edited by Metcalfe and Chalk top among the list of edited books.

CONCLUSION

The present citation study shows that 97.20% Botanists write their research papers/articles in English language. It is seen that majority of the authors (43.86 percent) want to write their research papers / articles solely means as single author; however, 24.86 percent authors in multiple authorship. They also want to cite journal more frequently which are of recent origin as journals are cited from 2001-2010 decade rather than books which are cited from older 1981-1990 decades.

However, they also cite 41-50 years old documents too. Kayode, J. is the most cited author and Ethnobotany journal is the topmost journal with 90 citations. Lastly, the "Phytochemical Methods", edited by Harborne, J.B. is the most cited edited books which is preferred by Botanists.

Thus, the output of the study will help the researchers and scientists in selecting the most relevant journals in their research area. Equally, the findings may also be useful in developing the collection of libraries relating to Botany subject.

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